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CONTENTS

The Project Method — *William H. Kilpatrick*

Junior High Schools in Small Communities — *Milo B. Hillegas*

Fit to Fight—Are You a Slacker? — *Thomas D. Wood*

Comparison of Open-air with Indoor Classes — *W. A. McCall and A. E. Johnson*

Home Economics Studies in Grades Seven to Twelve — *Anna M. Cooley and Others*

College News and Departmental Notes

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THE PROJECT METHOD

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The word 'project' is perhaps the latest arrival to knock for admittance at the door of educational terminology. Shall we admit the stranger? Not wisely until two preliminary questions have first been answered in the affirmative: First, is there behind the proposed term and waiting even now to be christened a valid notion or concept which promises to render appreciable service in educational thinking? Second, if we grant the foregoing, does the term 'project' fitly designate the waiting concept? Because the question as to the concept and its worth is so much more significant than any matter of mere names, this discussion will deal almost exclusively with the first of the two inquiries. It is indeed entirely possible that some other term, as 'purposeful act', for example, would call attention to a more important element in the concept, and, if so, might prove superior as a term to the word 'project'. At the outset it is probably wise to caution the reader against expecting any great amount of novelty in the idea here presented. The metaphor of christening is not to be taken too seriously; the concept to be considered is not in fact newly born. Not a few readers will be disappointed that after all so little new is presented.

A little of the personal may perhaps serve to introduce the more formal discussion. In attacking with successive classes in educational theory the problem of method, I had felt increasingly the need of unifying more completely a number of important

related aspects of the educative process. I began to hope for some one concept which might serve this end. Such a concept, if found, must, so I thought, emphasize the factor of action, preferably wholehearted vigorous activity. It must at the same time provide a place for the adequate utilization of the laws of learning, and no less for the essential elements of the ethical quality of conduct. The last named looks of course to the social situation as well as to the individual attitude. Along with these should go, as it seemed, the important generalization that education is life—so easy to say and so hard to delimit. Could now all of these be contemplated under one workable notion? If yes, a great gain. In proportion as such a unifying concept could be found in like proportion would the work of presenting educational theory be facilitated; in like proportion should be the rapid spread of a better practice.

But could this unifying idea be found? Here was in fact the age-old problem of effective logical organization. My whole philosophic outlook had made me suspicious of so-called 'fundamental principles'. Was there yet another way of attaining unity? I do not mean to say that I asked these questions, either in these words or in this order. Rather is this a retrospective ordering of the more important outcomes. As the desired unification lay specifically in the field of method, might not some typical unit of concrete procedure supply the need—some unit of conduct that should be, as it were, a sample of life, a fair sample of the worthy life and consequently of education? As these questionings rose more definitely to mind, there came increasingly a belief—corroborated on many sides—that the unifying idea I sought was to be found in the conception of wholehearted purposeful activity proceeding in a social environment, or more briefly, in the unit element of such activity, the hearty purposeful act.

It is to this purposeful act with the emphasis on the word purpose that I myself apply the term 'project'. I did not invent the term nor did I start it on its educational career. Indeed, I do not know how long it has already been in use. I did, however, consciously appropriate the word to designate the typical unit of the worthy life described above. Others who were using the term seemed to me either to use it in a mechanical and partial

sense or to be intending in a general way what I tried to define more exactly. The purpose of this article is to attempt to clarify the concept underlying the term as much as it is to defend the claim of the concept to a place in our educational thinking. The actual terminology with which to designate the concept is, as was said before, to my mind a matter of relatively small moment. If, however, we think of a project as a pro-ject, something pro-jected, the reason for its adoption may better appear.

Postponing yet a little further the more systematic presentation of the matter, let us from some typical instances see more concretely what is contemplated under the term project or hearty purposeful act? Suppose a girl makes a dress. If she did in hearty fashion purpose to make the dress, if she planned it, if she made it herself, then I should say the instance is that of a typical project. We have a wholehearted purposeful act carried on amid social surroundings. That the dressmaking was purposeful is clear; the purpose once formed dominated each succeeding step in the process and gave unity to the whole. That the girl was wholehearted in the work was assured in the illustration. That the activity proceeded in a social environment is clear; other girls at least are to see the dress. As another instance, suppose a boy undertakes to get out a school newspaper. If he is in earnest about it, we again have the effective purpose being the essence of the project. So we may instance a pupil writing a letter (if the hearty purpose is present), a child listening absorbedly to a story, Newton explaining the motion of the moon on the principles of terrestrial dynamics, Demosthenes trying to arouse the Greeks against Philip, Da Vinci painting the *Last Supper*, my writing this article, a boy solving with felt purpose an 'original' in geometry. All of the foregoing have been acts of individual purposing, but this is not to rule out group projects: a class presents a play, a group of boys organize a base-ball nine, three pupils prepare to read a story to their comrades. It is clear then that projects may present every variety that purposes present in life. It is also clear that a mere description of outwardly observable facts might not disclose the essential factor, namely the presence of a dominating purpose. It is equally true that there can be every degree of approximation to full projects according as the animating purpose varies in clearness and

strength. If we conceive activities as ranging on a scale from those performed under dire compulsion up to those into which one puts his 'whole heart', the argument herein made restricts the term 'project' or purposeful act to the upper portions of the scale. An exact dividing line is hard to draw, and yields indeed in importance to the notion that psychological value increases with the degree of approximation to 'wholeheartedness'. As to the social environment element, some may feel that, however important this is to the fullest educative experience, it is still not essential to the conception of the purposeful act as here presented. These might therefore wish to leave this element out of the defining discussion. To this I should not object if it were clearly understood that the resulting concept—now essentially psychological in character—generally speaking, demands the social situation both for its practical working and for the comparative valuation of proffered projects.

With this general introduction, we may, in the first place, say that the purposeful act is the typical unit of the worthy life. Not that all purposes are good, but that the worthy life consists of purposive activity and not mere drifting. We scorn the man who passively accepts what fate or some other chance brings to him. We admire the man who is master of his fate, who with deliberate regard for a total situation forms clear and far-reaching purposes, who plans and executes with nice care the purposes so formed. A man who habitually so regulates his life with reference to worthy social aims meets at once the demands for practical efficiency and of moral responsibility. Such a one presents the ideal of democratic citizenship. It is equally true that the purposeful act is not the unit of life for the serf or the slave. These poor unfortunates must in the interest of the overmastering system be habituated to act with a minimum of their own purposing and with a maximum of servile acceptance of others' purposes. In important matters they merely follow plans handed down to them from above, and execute these according to prescribed directions. For them another carries responsibility and upon the results of their labor another passes judgment. No such plan as that here advocated would produce the kind of docility required for their hopeless fate. But it is a democracy which we contemplate and with which we are here concerned.

As the purposeful act is thus the typical unit of the worthy life in a democratic society, so also should it be made the typical unit of school procedure. We of America have for years increasingly desired that education be considered as life itself and not as a mere preparation for later living. The conception before us promises a definite step toward the attainment of this end. If the purposeful act be in reality the typical unit of the worthy life, then it follows that to base education on purposeful acts is exactly to identify the process of education with worthy living itself. The two become then the same. All the arguments for placing education on a life basis seem, to me at any rate, to concur in support of this thesis. On this basis education has become life. And if the purposeful act thus makes of education life itself, could we reasoning in advance expect to find a better preparation for later life than practice in living now? We have heard of old that "we learn to do by doing," and much wisdom resides in the saying. If the worthy life of the coming day is to consist of well-chosen purposeful acts, what preparation for that time could promise more than practice now, under discriminating guidance, in forming and executing worthy purposes? To this end must the child have within rather large limits the opportunity to purpose. For the issues of his act he must—in like limits—be held accountable. That the child may properly progress, the total situation—all the factors of life, including comrades—speaking, if need be through the teacher, must make clear its selective judgment upon what he does, approving the better, rejecting the worse. In a true sense the whole remaining discussion is but to support the contention here argued in advance that education based on the purposeful act prepares best for life while at the same time it constitutes the present worthy life itself.

A more explicit reason for making the purposeful act the typical unit of instruction is found in the utilization of the laws of learning which this plan affords. I am assuming that it is not necessary in this magazine to justify or even explain at length these laws.[1] Any act of conduct consists of a response to the existing situation. That response and not some other followed the given situation because there existed in the nervous system

[1] The discussion which here follows is adapted from Thorndike's *Educational Psychology*, Vol. II, pp. 1–16.

a bond or connection joining the stimulus of that situation with that response. Some such bonds come with us into the world, as, for example, the infant cries (responds) when he is very hungry (situation acting as stimulus). Other bonds are acquired, as when the child later asks in words for food when he is hungry. The process of acquiring or otherwise changing bonds we call learning. The careful statements of the conditions under which bonds are built or changed are the laws of learning. Bonds are not always equally *ready* to act: when I am angry, the bonds that have to do with smiling are distinctly unready; other bonds controlling uglier behavior are quite ready. When a bond is ready to act, to act gives *satisfaction* and not to act gives *annoyance*. When a bond is not ready to act, to act gives annoyance and not to act gives satisfaction. These two statements constitute the Law of Readiness. The law that most concerns us in this discussion is that of Effect: when a modifiable bond acts, it is strengthened or weakened according as satisfaction or annoyance results. The ordinary psychology of common observation has not been so conscious of these two laws as it has of the third law, that of Exercise; but for our present purposes, repetition simply means the continued application of the law of Effect.[2] There are yet other laws necessary for a full explanation of the facts of learning. Our available space allows for only one more, that of 'set' or attitude, the others we have to assume without explicit reference. When a person is very angry, he is sometimes colloquially said to be "mad all over." Such a phrase implies that many bonds are ready to act conjointly to an end, in this case, the end of overcoming or doing damage to the object of anger. Under such conditions there is (*a*) available and at work a stock of energy for attaining the end, (*b*) a state of readiness in the bonds pertaining to the activity at hand, and (*c*) a correlative unreadiness on the part of the bonds that might thwart the attainment of the end contemplated by the 'set'. The reader is asked to note (*a*) how a 'set' towards an end means readiness and action of pertinent bonds with reference to that end, (*b*) how this end defines success, (*c*) how readiness means satisfaction when success is attained, and (*d*) how satisfaction strengthens the

[2] The law of Exercise does of course include more than this, as the successful educator must know if he would meet all situations.

bonds whose action brought success. These facts fit well with the generalization that man's mental powers and capacities came into being in connection with the continual attaining of ends demanded by the life of the organism. The capacity for 'set' means in the case of man the capacity for determined and directed action. Such action means for our discussion not only that (objective) success is more likely to result, but that learning better takes place. The bonds whose action brought success are by the resulting satisfaction more firmly fixed, both as distinct bonds separately considered and as a system of bonds working together under the 'set'. Set, readiness, determined action, success, satisfaction, and learning are inherently connected.

How then does the purposeful act utilize the laws of learning? A boy is intent upon making a kite that will fly. So far he has not succeeded. The purpose is clear. This purpose is but the 'set' consciously and volitionally bent on its end. As set the purpose is the inner urge that carries the boy on in the face of hindrance and difficulty. It brings 'readiness' to pertinent inner resources of knowledge and thought. Eye and hand are made alert. The purpose acting as aim guides the boy's thinking, directs his examination of plan and material, elicits from within appropriate suggestions, and tests these several suggestions by their pertinency to the end in view. The purpose in that it contemplates a specific end defines success: the kite must fly or he has failed. The progressive attaining of success with reference to subordinate aims brings satisfaction at the successive stages of completion. Satisfaction in detail and in respect of the whole by the automatic working of the second law of learning (Effect) fixes the several bonds which by their successive successes brought the finally successful kite. The purpose thus supplies the motive power, makes available inner resources, guides the process to its pre-conceived end, and by this satisfactory success fixes in the boy's mind and character the successful steps as part and parcel of one whole. The purposeful act does utilize the laws of learning.

But this account does not yet exhaust the influence of the purpose on the resulting learning. Suppose as extreme cases two boys making kites, the one with wholeheartedness of purpose, as we have just described, the other under direst compulsion as a

most unwelcome task. For simplicity's sake suppose the latter under enforced directions makes a kite identical with the other. Call the identical movements in the two cases the 'primary' responses in kite-making. These furnish the kind of responses that we can and customarily do assign as tasks—the external irreducible minimum for the matter at hand. Upon such we can feasibly insist, even to the point of punishment if we so decide. Follow now the thinking of the two boys as they make their kites. Besides the thinking necessarily involved in the 'primary' responses, other thoughts, few or many, will come; some perhaps of materials or processes involved, penumbrae as it were of the primary responses; others more personal or by way of comment upon the process. The penumbrae of the primary we may call the 'accessory' or complementary responses; the others, the 'concomitants' or by-products of the activity. The terminology is not entirely happy, and exact lines of division are not easy to draw; but the distinctions may perhaps help us to see a further function of purpose.

As for the primary responses we need do little more than recall the discussion of the immediately preceding paragraphs. The factor of 'set' conditions the learning process. A strong set acting through the satisfaction which attends success fixes quickly and strongly the bonds which brought success. In the case of coercion, however, a different state of affairs holds. There are in effect two sets operating: one set kept in existence solely through coercion is concerned to make a kite that will pass muster; the other set has a different end and would pursue a different course were the coercion removed. Each set in so far as it actually exists means a possible satisfaction and in that degree a possible learning. But the two sets being opposed mean at times a confusion as to the object of success, and in every case each set destroys a part of the other's satisfaction and so hampers the primary learning. So far then as concerns even the barest mechanics of kite-making, the boy of wholehearted purpose will emerge with a higher degree of skill and knowledge and his learning will longer abide with him.

In the case of the accessory or complementary responses, the difference is equally noticeable. The unified set of wholeheartedness will render available all the pertinent connected inner re-

sources. A wealth of marginal responses will be ready to come forward at every opportunity. Thoughts will be turned over and over, and each step will be connected in many ways with other experiences. Alluring leads in various allied directions will open before the boy, which only the dominant present purpose could suffice to postpone. The element of satisfaction will attend connections seen, so that the complex of allied thinking will the longer remain as a mental possession. All of this is exactly not so with the other boy. The forbidden 'set' so long as it persists will pretty effectually quench the glow of thought. Unreadiness will rather characterize his attitude. Responses accessory to the work at hand will be few in number, and the few that come will lack the element of satisfaction to fix them. Where the one boy has a wealth of accessory ideas, the other has poverty. What abides with the one, is fleeting with the other. Even more pronounced is the difference in the by-products or *concomitants* from these contrasted activities. The one boy looks upon his school activity with joy and confidence and plans yet other projects; the other counts his school a bore and begins to look elsewhere for the expression there denied. To the one the teacher is a friend and comrade; to the other, a taskmaster and enemy. The one easily feels himself on the side of the school and other social agencies, the other with equal ease considers them all instruments of suppression.

The contrasts here made are consciously of extremes. Most children live between the two. The question is whether we shall not consciously put before us as an ideal the one type of activity and approximate it as closely as we can rather than supinely rest content to live as close to the other type as do the general run of our American schools. Does not the ordinary school among us put its almost exclusive attention on the *primary* responses and the learning of these in the second fashion here described? Do we not too often reduce the subject matter of instruction to the level of this type alone? Does not our examination system—even our scientific tests at times—tend to carry us in the same direction? How many children at the close of a course decisively shut the book and say, "Thank gracious, I am through with that!" How many people 'get an education' and yet hate books and hate to think?

The thought suggested at the close of the preceding paragraph may be generalized into a criterion more widely applicable. The richness of life is seen upon reflection to depend, in large measure at least, upon the tendency of what one does to suggest and prepare for succeeding activities. Any activity—beyond the barest physical wants—which does not thus 'lead on' becomes in time stale and flat. Such 'leading on' means that the individual has been modified so that he sees what before he did not see or does what before he could not do. But this is exactly to say that the activity has had an educative effect. Not to elaborate the argument, we may assert that the richness of life depends exactly on its tendency to lead one on to other like fruitful activity; that the degree of this tendency consists exactly in the educative effect of the activity involved; and that we may therefore take as the criterion of the value of any activity—whether intentionally educative or not—its tendency directly or indirectly to lead the individual and others whom he touches on to other like fruitful activity. If we apply this criterion to the common run of American schools we get exactly the discouraging results indicated above. It is the thesis of this paper that these evil results must inevitably follow the effort to found our educational procedure on an unending round of set tasks in conscious disregard of the element of dominant purpose in those who perform the tasks. This again is not to say that every purpose is good nor that the child is a suitable judge as between purposes nor that he is never to be forced to act against a purpose which he entertains. We contemplate no scheme of subordination of teacher or school to childish whim; but we do mean that any plan of educational procedure which does not aim consciously and insistently at securing and utilizing vigorous purposing on the part of the pupils is founded essentially on an ineffective and unfruitful basis. Nor is the quest for desirable purposes hopeless. There is no necessary conflict in kind between the social demands and the child's interests. Our whole fabric of institutional life grew out of human interests. The path of the race is here a possible path for the individual. There is no normal boy but has already many socially desirable interests and is capable of many more. It is the special duty and opportunity of the teacher to guide the pupil through his present interests and achievement into the

wider interests and achievement demanded by the wider social life of the older world.

The question of moral education was implicitly raised in the preceding paragraph. What is the effect on morals of the plan herein advocated? A full discussion is unfortunately impossible. Speaking for myself, however, I consider the possibilities for building moral character in a régime of purposeful activity one of the strongest points in its favor; and contrariwise the tendency toward a selfish individualism one of the strongest counts against our customary set-task sit-alone-at-your-own-desk procedure. Moral character is primarily an affair of shared social relationships, the disposition to determine one's conduct and attitudes with reference to the welfare of the group. This means, psychologically, building stimulus-response bonds such that when certain ideas are present as stimuli certain approved responses will follow. We are then concerned that children get a goodly stock of ideas to serve as stimuli for conduct, that they develop good judgment for selecting the idea appropriate in a given case, and that they have firmly built such response bonds as will bring —as inevitably as possible—the appropriate conduct once the proper idea has been chosen. In terms of this (necessarily simplified) analysis we wish such school procedure as will most probably result in the requisite body of ideas, in the needed skill in judging a moral situation, and in unfailing appropriate response bonds. To get these three can we conceive of a better way than by living in a social *milieu* which provides, under competent supervision, for shared coping with a variety of social situations? In the school procedure here advocated children are living together in the pursuit of a rich variety of purposes, some individually sought, many conjointly. As must happen in social commingling, occasions of moral stress will arise, but here —fortunately—under conditions that exclude extreme and especially harmful cases. Under the eye of the skillful teacher the children as an embryonic society will make increasingly finer discriminations as to what is right and proper. Ideas and judgment come thus. Motive and occasion arise together; the teacher has but to steer the process of evaluating the situation. The teacher's success—if we believe in democracy—will consist in

gradually eliminating himself or herself from the success of the procedure.

Not only do defined ideas and skill in judging come from such a situation, but response bonds as well. The continual sharing of purposes in such a school offers ideal conditions for forming the necessary habits of give and take. The laws of learning hold here as elsewhere, especially the Law of Effect. If the child is to set up habits of acting, satisfaction must attend the doing or annoyance the failure. Now there are few satisfactions so gratifying and few annoyances so distressing as the approval and the disapproval of our comrades. Anticipated approval will care for most cases; but the positive social disapproval of one's fellows has peculiar potency. When the teacher merely coerces and the other pupils side with their comrade, a contrary 'set'—such as we earlier discussed—is almost inevitable, often so definite as to prevent the fixing in the child's character of the desired response. Conformity may be but outward. But when all concerned take part in deciding what is just—if the teacher act wisely—there is far less likelihood of an opposing 'set'. Somehow disapproval by those who understand from one's own point of view tends to dissolve an opposing 'set', and one acts then more fully from his own decision. In such cases the desired bond is better built in one's moral character. Conformity is not merely outward. It is necessary to emphasize the part the teacher plays in this group building of bonds. Left alone, as 'the gentleman's grade' in college indicates, pupils may develop habits of dawdling. Against this purposelessness the present thesis is especially directed; but proper ideals must be built up in the school group. As an ideal is but an idea joined with tendencies to act, the procedure for building has been discussed; but the teacher is responsible for the results. The pupils working under his guidance must through the social experiences encountered build the ideals necessary for approved social life. The régime of purposeful activity offers then a wider variety of educative moral experiences more nearly typical of life itself than does our usual school procedure, lends itself better to the educative evaluation of these, and provides better for the fixing of all as permanent acquisitions in the intelligent moral character.

The question of the growth or building of interests is important in the theory of the plan here discussed. Many points still prove difficult, but some things can be said. Most obvious is the fact of 'maturing' (itself a difficult topic). At first an infant responds automatically to his environment. Only later, after many experiences have been organized, can he, properly speaking, entertain purposes; and in this there are many gradations. Similarly, the earliest steps involved in working out a set are those that have been instinctively joined with the process. Later on, steps may be taken by 'suggestion' (the relatively automatic working of acquired associations). Only comparatively late do we find true adaptation of means to end, the conscious choice of steps to the attainment of deliberately formed purposes. These considerations must qualify any statements made regarding child purposes. In this connection a quotation from Woodworth's new book is pertinent: "Almost any object, almost any act, and particularly almost any process or change in objects that can be directed by one's own activity toward some definite end, is interesting on its own account, and furnishes its own drive, once it is fairly initiated." (*Dynamic Psychology*, p. 202.) One result of the growth here discussed is the 'leading on' it affords. A skill acquired as end can be applied as means to new purposes. Skill or idea arising first in connection with means may be singled out for special consideration and so form new ends. This last is one of the most fruitful sources of new interests, particularly of the intellectual kind.

In connection with this 'maturing' goes a general increase in the 'interest span', the length of time during which a set will remain active, the time within which a child will—if allowed—work at any given project. What part of this increase is due to nature and physical maturing, what part to nurture, why the span is long for some activities and short for others, how we can increase the span in any given cases, are questions of the greatest moment for the educator. It is a matter of common knowledge that within limits 'interests' may be built up, the correlative interest spans appreciably increased. Whatever else may be said, this must mean that stimulus-response bonds have been formed and this in accordance with the laws of learning. We have already seen the general part played by the factor of pur-

pose in utilizing the laws of learning. There seems no reason to doubt that like considerations hold here. In particular the discussion of coercion with its two opposed sets holds almost unchanged. Since the 'set' of external origin has its correlative goal and its consequent possible success, there is a theoretical possibility of learning. In this way we may conceive a new interest built by coercion. Two factors, however, greatly affect the practical utilization of this possibility, the one inherently to hinder, the other possibly to help. The inherent hindrance is the opposed (internal) set, which in proportion to its intensity and persistence will confuse the definition of success and lessen the satisfaction of attainment. Acquiring a new interest is in this respect accordingly doubly and inherently hindered by coercion. The second factor, which may chance favorably, is the possibility that what (reduced) learning takes place may connect with some already potentially existent interest giving such expression to it that the inner opposition to the enforced activity is won over, and the opposing set dissolved. This second factor is of especial significance for the light it throws upon the relation of teacher and pupils in this matter of coercion. It seems from these considerations that if compulsion will result in such learning as sets free some self-continuing activity and these before harmful concomitants have been set up, we may approve such compulsion as a useful temporary device. Otherwise, so far as concerns the building of interests, the use of coercion seems a choice of evils with the general probabilities opposing.[3]

It may be well to come closer to the customary subject matter of the school. Let us consider the classification of the different types of projects: Type 1, where the purpose is to embody some idea or plan in external form, as building a boat, writing a letter, presenting a play; type 2, where the purpose is to enjoy some (esthetic) experience, as listening to a story, hearing a symphony,

[3] Coercion may be permissible as a particular expedient in some other instances, as when damage is about to be done either to others or to property or to the child himself. Clearly this is a temporary device and, even in these cases, generally a choice of evils.

There are some who needlessly confuse coercion with purposeful action in the face of difficulty. A certain stress of difficulty is healthy, probably necessary to wholeheartedness. Without it there is likely mere routine action of functions already learned. On the other hand, too great a difficulty means failure often with discouragement. In between these extremes lies the most educative activity.

appreciating a picture; type 3, where the purpose is to straighten out some intellectual difficulty, to solve some problem, as to find out whether or not dew falls, to ascertain how New York outgrew Philadelphia; type 4, where the purpose is to obtain some item or degree of skill or knowledge, as learning to write grade 14 on the Thorndike Scale, learning the irregular verbs in French. It is at once evident that these groupings more or less overlap and that one type may be used as means to another as end. It may be of interest to note that with these definitions the project method logically includes the problem method as a special case. The value of such a classification as that here given seems to me to lie in the light it should throw on the kind of projects teachers may expect and on the procedure that normally prevails in the several types. For type 1 the following steps have been suggested: purposing, planning, executing and judging. It is in accord with the general theory here advocated that the child as far as possible take each step himself. Total failure, however, may hurt more than assistance. The opposed dangers seem to be on the one hand that the child may not come out master of the process, on the other that he may waste time. The teacher must steer the child through these narrows, taking care meanwhile to avoid the other dangers previously discussed. The function of the purpose and the place of thinking in the process need but be mentioned. Attention may be called to the fourth step, that the child as he grows older may increasingly judge the result in terms of the aim and with increasing care and success draw from the process its lessons for the future.

Type 2, enjoying an esthetic experience, may seem to some hardly to belong in the list of projects. But the factor of purpose undoubtedly guides the process and—I must think—influences the growth of appreciation. I have, however, as yet no definite procedure steps to point out.

Type 3, that of the problem, is of all the best known, owing to the work of Professors Dewey and McMurry. The steps that have been used are those of the Dewey analysis of thought.[4] This type lends itself, next to type 4, best of all to our ordinary school-room work. For this reason I have myself feared its overemphasis. Our schools—at least in my judgment—do emphati-

[4] Dewey, *How We Think*, Chap. VI.

cally need a great increase in the social activity possible in type 1. Type 4, where the purpose has to do with specific items of knowledge or skill, would seem to call for the same steps as type 1, purposing, planning, executing, and judging. Only here, the planning had perhaps best come from the psychologist. In this type also there is danger of over-emphasis. Some teachers indeed may not closely discriminate between drill as a project and a drill as a set task, although the results will be markedly different.

The limits of the article forbid a discussion of other important aspects of the topic: the changes necessitated by this plan in room furniture and equipment, perhaps in school architecture, the new type of text-book, the new kind of curriculum and program, possibly new plans of grading and promotion, most of all a changed attitude as to what to wish for in the way of achievement. Nor can we consider what this type of procedure means for democracy in furnishing us better citizens, alert, able to think and act, too intelligently critical to be easily hoodwinked either by politicians or by patent-medicines, self-reliant, ready of adaptation to the new social conditions that impend. The question of difficulties would itself require a separate article: opposition of tradition, of taxpayers; unprepared and incompetent teachers; the absence of a worked-out procedure; problems of administration and supervision. All these and more would suffice to destroy the movement were it not deeply grounded.

In conclusion, then, we may say that the child is naturally active, especially along social lines. Heretofore a régime of coercion has only too often reduced our schools to aimless dawdling and our pupils to selfish individualists. Some in reaction have resorted to foolish humoring of childish whims. The contention of this paper is that wholehearted purposeful activity in a social situation as the typical unit of school procedure is the best guarantee of the utilization of the child's native capacities now too frequently wasted. Under proper guidance purpose means efficiency, not only in reaching the projected end of the activity immediately at hand, but even more in securing from the activity the learning which it potentially contains. Learning of all kinds and in its all desirable ramifications best proceeds in proportion as wholeheartedness of purpose is present. With the

child naturally social and with the skillful teacher to stimulate and guide his purposing, we can especially expect that kind of learning we call character building. The necessary reconstruction consequent upon these considerations offers a most alluring 'project' to the teacher who but dares to purpose.

THE ORGANIZATION OF JUNIOR HIGH SCHOOLS IN SMALL COMMUNITIES

By MILO B. HILLEGAS
State Commissioner of Education for Vermont

Scattered throughout Vermont are communities so small that there are not sufficient boys and girls to warrant the establishment of a regular high school. At the same time these communities are so remote from larger centers that few of the children ever enter high school and even these must do so by sacrificing home ties at a time in their lives when they most need the guiding influences of a father and mother. In some of the states fully one-third of the population is thus situated.

If there be any difference in the desire for high school education between our urban and our rural parents and their boys and girls, it is in favor of the country. It follows that if we were able to supply secondary school facilities to these young people we could greatly increase the number of high school students as well as those who enter our normal schools, colleges, and technological institutions.

Many devices have been employed to meet this situation. The more common of these have been the one-teacher two and four-year high schools, compulsory payment of tuition by towns, and state aid. Except in rare instances the one-teacher high school has been a positive failure. The work in the upper grades of the rural schools in particular has commonly been so inadequate that many of the pupils are not able to secure training sufficient to enable them to enter the high school. Consequently, the town and state are relieved from the burden of financial assistance. We must also acknowledge that the work offered in the high schools has not been sufficiently attractive to hold many of the boys and girls who could attend if they so desired.

In Vermont the junior high school is helping in the solution of this problem. During 1916–1917 there were twelve of these schools in successful operation in our state and their appeal to parents and children was sufficient to produce a steady increase

in their enrollment and attendance. A considerable number of those who had previously left school returned and virtually no students dropped except as they moved from town. In one community where records were carefully examined it was found that the normal number of pupils who entered the grades represented by the junior high school had been in previous years sixty-two, while of these about forty-eight usually remained at the end of the year. Last year again sixty-two entered but at the close of the year sixty-eight were in attendance. There are reasons to believe that it was not merely the novelty of the situation that led to these increasing numbers and thus far this year we find even more marked improvement in enrollment and attendance.

As organized in Vermont, the junior high school covers four years, or the grades usually included in the seventh and eighth years of the elementary school together with the first two years of the high school. This so-called six-four-two plan may or may not be desirable in all communities. It is satisfactory for the small communities of Vermont because it brings at least two years of high school education close to the homes of the boys and girls and represents about the maximum that these schools can do effectively without additional teachers and a consequent expense that would be prohibitive.

The law provides state aid for these schools and at the same time it requires the approval of the State Board of Education before any community may reorganize its schools. This is a frank acknowledgment that the junior high school is more expensive than the regular school organization and that it must be started with care and under conditions favorable to its development. At the beginning the tendency was to keep the seventh and eighth grades and the first and second years of the high school quite distinct and to use the state aid to decrease the towns' expenditure for schools. This condition no longer exists. The State Board of Education has used its authority to prevent some school officials from making a change that was not sanctioned by the community or for which they had no adequate facilities. The number of schools has increased to twenty-eight and it seems probable that we shall eventually have one hundred or more.

The administrative details attending the organization of junior high schools in Vermont have been few and for the most part simple. School buildings have been quickly and cheaply transformed. Any building capable of accommodating the school under old conditions can usually be remodelled without expensive operations to accommodate the junior high school. The State Board of Education has set a minimum requirement of three teachers, one of whom must be a man trained in agriculture and one a woman who has had training in home-making. This requirement has worked very little hardship on the communities because one of these three teachers takes the place of the former grammar teacher, another takes the place of the former high school teacher, and the state assistance is about sufficient to pay the salary of the third teacher. We have encountered more difficulty in preventing the over-equipment of these schools than we have in securing that which is needed. One has only to visit schools to be made aware of the enormous waste of money and good storage space that has come about as the result of an over-zealous purchasing of equipment. A sewing machine, a cook stove using the fuel commonly used in that community, and cooking utensils such as the girls have in their own homes constitute the domestic science equipment. A Babcock tester and some of the more common carpenter and garden tools make up the agriculture equipment. As might be expected the greatest difficulties have been met whenever the new organization has changed tradition. Teachers and school officials are likely to continue to think in the terms of the seventh and eighth grades and the first and second years of the high school and to seat and to treat the pupils as such with the result that they have a junior high school in name only. Almost invariably the school officials desire to place the kitchen in the basement or in some other out-of-the-way place because it has not been customary to have this work in the school. They also cling to the fixed desks even though these would involve an increased expenditure of money.

We have not made fixed requirements regarding the qualifications of teachers. It is impossible to secure those who have been trained for this work and promising ones are so scarce that we have been glad to accept anyone who has evidence of the ability that we demand. In the main we have secured college gradu-

ates, and we have invariably given preference to the young and relatively inexperienced teachers because they find it easier to make the adjustments required. When difficulties arise, such persons are inclined to settle them in accordance with the principles controlling the school while the older teacher relies upon experience and consequently soon drifts back into the same practices that obtain in the grades and the regular high school. These older teachers are, moreover, very likely to be out of sympathy with the new plan, and they take occasion to demonstrate that the same kind of teaching that they have done in the past can and should be used in the junior high school. When a teacher's qualifications have been in question we have first of all asked ourselves whether the teacher would be employed in a regular high school. This has, of course, ruled out those who have been successful seventh and eighth grade teachers, but whose academic training is not sufficient to admit them to high school teaching. We also insist that the principal of the school do a large part of his teaching with the earlier years of the junior high school. He is thus brought in touch with the larger number of the children and we secure whatever advantage there may be in the influence of a man as teacher.

Changes in administrative details are only incidental to the organization of a junior high school. The fundamental changes required to establish such a school are connected with its aims and purposes, the course of study, and the teaching method. All of these changes may come about in the present school organization. Here and there progressive teachers in the regular school system are conducting their work in much the same way as is desirable in the junior high school. It should be urged, however, that this new institution with its lack of traditions is an easy organization in which to bring about such changes as competent superintendents and teachers believe to be necessary. Our present system with its forms so rigid that a departure from them is likely to interfere with the superintendent's grading of the teachers is a most difficult place for change.

A part of our school children will go to college—ten, fifteen, or perhaps twenty in every hundred. The other eighty, eighty-five, or ninety per cent will enter upon their life work without higher education. These are about the only assertions it is safe

to make concerning the future of these children. It will be as great a mistake to treat all as though they would not go to college as it has been to treat all as though they were certain to go. We must admit that a large proportion of the young people who now leave school carry with them a sense of defeat. They accept their own stupidity as a matter of course because they have accepted the *F*'s or failures or sixty per cents that they received in school as a final estimate of themselves. Thus conversation with any group of workmen will soon convince one of their judgment of themselves in reference to school work. Teachers need to remember that every time they release one of their so-called failures they must face him again as a tax-payer and a voter—one who must be taken into consideration whenever they need improvements in the school system. It is not surprising that the public has been so slow to give assistance to the public schools while many other institutions are almost embarrassed with the willingness of the public to coöperate. Parents cannot be expected to develop great enthusiasm for the school when every morning they are required to exhaust their parental authority in order to force their children to attend. Neither can they be expected to be hopeful when these children return with problems of the familiar type: If Mr. A pays $\$2\,^3/_5$ per yard for cloth, find how many yards he can buy for $\$93\,^3/_7$. A parent does not understand that consciously or unconsciously the school is by these means testing his children to determine whether or not they shall eventually go to college. Some months ago the principal of a well-known industrial school told a group of listeners that he had in his school yard a pile of sand and that the first test he gave to boys who applied for admission to his school was to order them to wheel sand from one side of the yard to the other. When this task was completed, they were required to wheel it back, and the boys who rebelled were refused admission. One member of the group of listeners remarked that in his opinion the principal had thus positively shut out every intelligent individual and that his school was consequently concerning itself only with the stupids. This may not be quite the case with our public school system, but it is disquieting, nevertheless, to say the least, to see what success sometimes comes to those who have escaped from the school's care.

The junior high school even in the small communities may be organized so as to care for the various types of students. Further, the way to college should never be closed to these boys and girls. On the other hand, their work should not be so remote from life interests as to render school work a drudgery, and result in failure. In about twenty of the existing twenty-eight junior high schools in Vermont no attempt has been made to deal with the last two years of the high school because there are not sufficient students at present to warrant the necessary expenditure for this work. Care has been taken in the case of every individual to arrange his work during the four years of the junior high school so that at its completion he will have at least eight of the fourteen and a half units required for college entrance. The only irregularity that exists is in connection with Latin, since not every small school is equipped to teach this subject well. We have not been particularly concerned with the controversy regarding the value of Latin, although in Vermont as elsewhere a knowledge of Latin is often considered the equivalent of an education. This opinion holds not alone among college-trained people but also among our most humble rural population. Consequently, Latin has been given in every school where there was a demand. However, this subject is not required for entrance to some colleges and consequently those who have not had it are not deprived of the privileges of entering college.

We have devoted not less care to the welfare of those who leave before entering college. The most pronounced break in our whole school system above the regular kindergarten occurs between the elementary school and the high school. It is assumed that the elementary school takes care of reading, writing, arithmetic, English grammar, and, to a large extent, United States history. English is the only subject that carries over even by name from one school to the other. Its character, however, is so changed as to make it virtually a new study. There is no valid reason for this break between the two schools yet in most cases the high school instructor will severely criticize the elementary teacher who takes the 'edge' off his specialty. If by chance a student displays an ignorance of grammar or arithmetic in the high school his teachers are likely to regard it as a condition to be regretted; but the grammar school teachers were responsible

for these subjects and the high school teachers in language and algebra cannot 'cover the ground' if they stop to correct these deficiencies. However, when conditions are so changed that the teacher of algebra also teaches some of the arithmetic, much that is important in algebra can be woven into the arithmetic. When the foreign language teacher has the children at the same time that they are studying English grammar one subject can be made to help the other. This arrangement also brings the child in touch with a wider range of subjects with the result that he is more competent to make intelligent choices if he continues his school work; and if he leaves his school he still has the benefit of the experiences which come from explaining many subjects. This is one accomplishment of the junior high school organization.

In rural communities agriculture and home-making must receive attention if we expect to utilize children's experiences in acquiring new knowledge. However, the aim should not be primarily to make farmers or kitchen help out of these boys and girls. The environment of these children furnishes such an abundance of teaching material that to ignore it would be a mistake. There can be no excuse for these boys and girls beginning and ending their study of machines, hydraulics, germination, and the like from books in a cramped laboratory when they can see these phenomena in their natural setting.

The junior high school calls for a new type of teacher. It is a mistake for any superintendent to believe that he can start a junior high school either in the city or in the country by selecting his teachers from the present staff. Some institutions are now giving attention to the preparation of junior high school teachers. Soon we may expect to be able to secure properly qualified persons. At present there seems no way other than to prepare our teachers while they are in service. This calls for competent supervisors. The men and women who are employed for this purpose must be so thoroughly in sympathy with the school and with the teacher that their presence in the schoolroom will be welcome. In Vermont the State Board of Education has been willing to assume joint responsibility with the school for the character of instruction. If a failure occurs in any school the school officers have a perfect right to hold us equally responsible with themselves. We have entirely given up the notion of a

state inspector who usually attempts to accomplish through fear what we believe should be accomplished by coöperation.

The junior high school offers an opportunity to improve instruction. It is probably too much to expect that one teacher in the grammar grades or one teacher in the high school can be equally efficient in all subjects. With the introduction of three teachers there can be a beginning at specialization and yet the children can be placed in advisory groups so as to avoid the objectionable phases of departmental teaching. Under the old system the eighth or ninth grades of the elementary schools in our state were largely devoted to reviews and definite preparation for high school. It happened that at the very time in a child's life when he needed some new outlook he was confined to subjects that had already been studied and which therefore presented nothing of interest to him. That condition does not exist in the small junior high school. The home-making and agricultural courses form a natural tie between the homes and the school. It often happens that mothers come into the school kitchen and demonstrate to the girls how to make the things for which they are particularly noted in that community. Fathers frequently come into the classroom in agriculture and explain to the boys some feature of their own work. Fundamentally our aim has been to bring the home into the school rather than to try to take the school into the home. It is true that our school has had an influence upon the community. Thus it is no uncommon occurrence to have the principal of the school and the boys go out into the field to prune trees, to demonstrate spraying, to select seeds for potatoes and corn, or to test a dairy herd. In a number of cases we have been bold enough to promote stupid boys and girls from as low as the fifth grade directly into the junior high school. Results have been most satisfactory. In one of the larger junior high schools a considerable group of such retarded and incompetent boys and girls were thus promoted. At the beginning of the second year new teachers in the school were unable to select the pupils thus advanced.

Not all of the problems connected with the organization of these schools have been solved, nor have all of the difficulties of rural education been met by the junior high school; but I do feel

justified in saying that this form of organization comes nearer to meeting our demands than any other form of organization.

Our experience and observation make us subscribe most sincerely to the definition which says the junior high school is an opportunity. It is an opportunity to give "all the children of all the people" the training best suited to their needs, whether they expect to continue their courses or to drop them; an opportunity to teach pupils how to solve their future problems by solving their present-day problems through their rich, meaningful, daily experience; an opportunity to teach pupils how to study by having both them and their teacher study together in a socialized recitation to which each pupil contributes his part, not because he is to be graded by the teacher but because he is making for the welfare of the group whose problems are his problems; an opportunity to get hold of pupils so as to retain a maximum number in school a maximum length of time; an opportunity for each child to grow and develop in the sunshine of genial teaching and loving companionship into the best, happiest, and most social personality of which he is capable.

FIT TO FIGHT
ARE YOU A SLACKER?

By THOMAS D. WOOD, M.D.
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This is a challenge to students and teachers.

Health is an abundance of life. Have you as much of this invaluable capital and commodity as you can reasonably get and helpfully use? If not, you are a slacker of one kind.

Physical fitness means sufficient physical ability and power for the excellent performance of the tasks you are doing or the tasks that may be demanded of you; not simply enough to be acceptable to you but enough to be acceptable to the world.

Physical fitness means as much ability and power as your country considers necessary and satisfactory; and the standards of the nation with reference to physical fitness as well as to other kinds of fitness for life, for citizenship are increasing and crystallizing with great rapidity in these days.

Human beings are, in physical fitness (on the average), the lowest in the scale of living things. Physical fitness, however, is as indispensable to mankind as to other creatures.

Physical fitness is as indispensable in peace as in war.

Physical fitness is as indispensable for adults as for children, for women as for men, for brain workers as for manual workers, for students and teachers as for everybody else.

Have you as much of health, of physical fitness, as you can get and maintain by intelligent, conscientious, and faithful effort? If not, you are a slacker—and a kind of slacker that will be increasingly unpopular, and more held to account as the days go by.

Are you fit to fight—in the cause of civilization, of reconstruction, of education, of national and world progress? The Allies are fighting for victory, for human freedom, for the safety of democracy, for the termination of all wars so far as mortal combats between human beings and armies are concerned. But war and fighting must still continue against the common, universal

enemies of mankind; against ignorance, disease, selfishness, irresponsibility, wastefulness, inefficiency.

As students you are being trained with special privilege and opportunity for leadership in this great army of democracy. As teachers, you are preparing and being prepared for officers' commissions in this great war for the fundamental and permanent values of humanity. Are you physically fit to fight in this campaign?

Our trained men fight the enemy in Europe. They are superb fighters. They are as near 100 per cent in body, mind, and morale for war as human means can train and keep them. Yet in the first great draft, 29 per cent of the young men of this nation were rejected for physical defects. The great majority of the young men accepted for the training camps improved so strikingly in health, vigor, and general physical fitness that they astonished themselves, their families, and even their officers. After the war these same fighting men are coming back with new standards of life, of fitness, of patriotism, for their fellow-citizens as well as for themselves. When that time comes are you going to be up to their standards?

Our young women are relatively, and, on the average, no more healthy and physically fit for the fight of life, for citizenship, than our young men; in some essential qualities, apparently even less so—and very little is being done for them. Yet our young women would show just as much improvement in physical efficiency with suitable training as have the young men in the great military camps.

As for the children—75 per cent of the school children of America have physical defects which are potentially or actually injurious to health and destructive to physical fitness. Most of these defects are remediable, but most of them are also being wastefully neglected. Our present educational program is seriously and inexcusably deficient, not only in the provision for removal of defects but in other even more positive, constructive measures for the inculcation of habits of healthful living and for the development of complete physical fitness.

How about the health and physical fitness of teachers? According to their own testimony, at least 30 per cent of them are below a minimum health standard. Of teachers who have taught

five years or more, 30 per cent are in poorer health and less fit physically than they were when they began to teach. While some of the conditions which lower the physical fitness of teachers are beyond their powers of personal control, still the gain in physical fitness, within the control of the teachers themselves, would, if demonstrated, make an astounding showing. Ninety per cent of the teachers are living well below the level of physical fitness attainable by them. Where do you stand? Do you belong to the 10 per cent of physically fit teachers? Perhaps—but the chances are nine to one that you do not.

However, physical fitness is not everything. It is not the main goal of life or of education. It is not even always immediately essential to what is finest in mind, personality, and character. Some of the great men of history have accomplished deeds of immortal distinction in spite of pain and physical disability. However, nothing in such lives can be interpreted in defence or praise of physical weakness or unfitness. It must be conceded that physical fitness is a fundamental requisite for the completeness and best in life.

By what signs, then, may you conclude that you are physically fit? Here are some of them:

1. A sense of physical well-being. This means that you should feel a zest and satisfaction in mental and muscular effort; an interest and joy in work and recreation, kept in sensible proportion and balance; and a freedom from pain—for this inevitably interferes with clear thinking, concentrated effort, and effective work.

2. A feeling of being refreshed and recuperated on rising in the morning after a customary night's rest, and a feeling of healthy fatigue as bedtime approaches. The hangover of fatigue in the morning, experienced by so many students and teachers, should be escaped from as fast as possible. On the other hand, a feeling of intellectual keenness and brilliancy in the late evening should be viewed with suspicion. It is an auto-intoxication of the nerves.

3. Enjoyment of wholesome food, including a moderately good appetite even for breakfast. To begin the day's work without a fairly nourishing breakfast is just as sensible as for a steamer captain to stoke his furnaces with the chopped up wood-work from his vessel. This extraordinary expenditure of fuel may, in both

cases, be necessary in rare emergencies but it is highly extravagant and, moreover, harmful to the internal architecture of the man as well as to the ship.

4. Body weight maintained at about the proper standard for height and age. A person who is 10 per cent or more under standard weight is probably undernourished and to some extent deficient in energy and endurance. The individual who is more than 10 per cent above standard weight is carrying burdensome "excess baggage" which is apt, with advancing years, to prove a handicap to health or perhaps to life.

5. Elimination from the intestinal tract. This should take place at least once daily.

6. Freedom from persistent worry. This is one of the most destructive influences upon life, health, and physical as well as mental fitness.

If you are honestly intent upon being physically fit, what should you do?

1. Admit to yourself the limitations upon your health, if such have been imposed upon you by ancestral influence and your own past life; but do not because of these be discouraged, or excuse yourself for being a health slacker. Then do the best you can with what you have. The health accomplishments of some delicate children and adults make up notable chapters, even if unrecorded, of heroic human achievement.

2. Free yourself from physical defects that are wholly or partially remediable, which may lower your physical fitness. A thorough health examination of the human machine, and advice at least once a year for children and adults detect flaws, will improve power, prevent disease, save the doctors' bills, lengthen life, and increase happiness. The eyes, ears, and teeth should be especially looked after. Defective eyes and ears may obstruct mental development, injure the general health, and produce serious social and economic loss.

Defective and neglected teeth have caused more physical deterioration of this nation than the use of alcohol—and no minimizing of the harmful effects of alcohol is here either stated or implied. Unrecognized teeth abscesses and diseased tonsils cause a majority of all cases of rheumatism and neuralgia, as

well as some other ills. Infections absorbed through the teeth and tonsils produce an alarming proportion of organic heart defects. No sentiment or superstition should prevent the removal of diseased tonsils. Correct your physical defects before they cripple you.

3. Eat regularly. Eat slowly. Eat patriotically in accord with the rules of the Food Administration.

Eat some hard food for the sake of the teeth; eat fresh, raw, or green food for the chemical needs of the body; eat meat or eggs only once a day.

Avoid undereating and underweight. Avoid overeating and overweight.

Eat lightly of easily digested food when tired, excited, or anxious.

Drink three to five glasses of water a day outside of mealtime. Never drink when there is solid food in the mouth.

Finally, before putting food into the mouth, always wash your hands.

4. Spend eight to nine hours in bed every night. Very few can maintain physical fitness with less than eight hours in bed daily. Many students and teachers will add much to productive efficiency by devoting nine hours to sleep and rest each day. Sleep out-of-doors when you can. Sleep as nearly as possible in outdoor air at all times. Outdoor air is the most valuable tonic known. It is also the cheapest and the most neglected of all tonics. Do not expect to sleep and rest well at night unless the body and extremities are warm.

If you are wise, you will also lie down for ten to twenty minutes rest near the middle of the day, if possible. Forty-five per cent of 1400 teachers in New York State testify that one of the most unhealthful school conditions affecting them is the lack of a place in which to rest or to lie down during noon intermission.

5. Spend at least an hour a day in recreation and exercise, outdoors, if possible; and it is possible, with few exceptions, even in stormy weather, if you plan intelligently enough.

Take exercise that is enjoyable, and vigorous enough to require deep breathing and to open the skin pores.

Exercise daily not only the extremities but the trunk of the body, even if you have to do briefly, in addition, some gymnastics indoors.

6. Acquire and maintain a good posture; weight over the balls of the feet; chest forward; abdomen back; the back not hollowed too much; the top of the head held as high as possible without fatiguing strain.

Seventy-five per cent of students and teachers have faulty, weak postures. Posture reflects and helps to determine mental attitude and efficiency as well as bodily fitness.

Avoid weak or fallen foot arches. Wear as healthful shoes as your rationalized hygienic sense will permit.

7. Take a cool tub, shower or sponge bath each morning before breakfast. Use a coarse towel, and flesh brushes, as the vigorous friction of the entire body surface is of great value. Twice a week take a warm cleansing bath at bedtime.

8. Attend to the evacuation of the intestine daily and with absolute regularity. Constipation is the most common of all physical ailments. It is the trench disease of sedentary workers.

Constipation produces auto-intoxication (self-poisoning) of the body and may also cause headache, indigestion, biliousness, and other disturbances even more serious. Avoid constipation by drinking sufficient water, eating bulky food and fruit, and taking regular, vigorous exercise. Avoid medicines for constipation, if possible. However, as a last resort, take a mild laxative rather than retain the poisonous waste matter in the body.

9. Get some form of mental as well as muscular recreation regularly. Cultivate some hobby for an avocation. Cultivate and preserve the play spirit. This is the best elixir of youth for teachers.

10. Avoid worry as you would avoid the plague.

Worry injures the nervous system, and is mentally harmful. Worry depresses the bodily functions, disturbs the secretions, and endangers the vital organs.

Worry decreases the resistance of the organism against some forms of communicable diseases and infections. Everywhere, worry is destructive and disintegrating.

Be cheerful. Be unselfish. Preserve a sense of humor. Cultivate your imagination. Be determined to keep physically fit, but don't worry about your health, of all things.

If you are not well, if the condition of the machine disturbs you, get expert advice.

Remember! if you are in fairly good condition, if you are living hygienically, if you are not worrying, hard work will not hurt you. It is the unhealthful living and the worry that do the harm.

It is the confident belief of the challenger in this message that no measure has been here advocated which will not more than repay for the time and effort expended. The wise investor will draw his dividends in the currency of improved physical fitness, increased efficiency, and a general satisfaction with his work and his world. Health coupons, too, are payable not merely on quarter days and at the year's end but hourly throughout a long life.

A COMPARISON OF OPEN-AIR WITH INDOOR CLASSES

By W. A. McCALL
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The psychological phases of this investigation were planned and guided to the end by the late Professor Naomi Norsworthy. The authors have organized as best they could the experimental records, a thorough knowledge of which was possessed only by Dr. Norsworthy.

Two classes, a third grade and a fourth grade class, received the regular instruction for a school year in open-air classrooms. There were two and sometimes more control classes in the ordinary indoor classrooms. A careful measurement was made of these and similar succeeding experimental groups for four years, 1912–1913, 1913–1914, 1914–1915, and 1915–1916. After the first year there was a fifth grade open-window class to compare with a fifth grade indoor class as well as with the open-air and indoor third and fourth grade classes. After the first year the third grade open-air class became most of the fourth grade open-air class and the fourth grade open-air class became the fifth grade open-window class. Even after the first year, however, the fourth grade open-air class recruited from other classes than the third grade open-air, nor was the open-window class recruited solely from the fourth grade open-air. Hereafter the open-window class will be grouped with the open-air classes, but the data will be so presented that the interested reader can separate it for special study.

Two types of measurement were made in December and May of each school year. The psychological tests were administered or supervised by Professors Norsworthy and Hillegas, and the physical tests by Dr. Harold B. Keyes. The writer does not feel competent to discuss the physical measurements. It is hoped Dr. Keyes will make a separate report later.

Dr. Keyes reported the results for one year before the Fourth International Congress on School Hygiene at Buffalo, August, 1913. His report[1] is published in the transactions of this congress. From it we draw this description of the open-air classrooms.

"In one of the highest sections of New York City, exposed to the air from ocean, river, and country, there are located on the roof of Teachers College, two open-air school-rooms. These are an integral part of the Horace Mann School. One accommodates sixteen children in the fourth grade, the other seventeen children of third grade rank and eleven children of second grade rank. These open-air rooms are of permanent structure, each with one side completely open to the outdoor air, and with at least one other side so built with windows that more than half of the side can be completely exposed to the elements, and always to early sun. The roofs contain each a large window somewhat shaded from the glare of the sun. The sides which are completely open face to the south and are never closed off except when rain would beat in upon the children and furniture. At such times a canvas covering serves to shut out rain."

Other provisions were movable seats, so children could take turns at sunshine exposure; protection of blackboard and pages from the sun's glare; an adjoining well-equipped roof playground where the children received instruction in physical exercise and indulged in normal play; frequent exercises in the room to insure mental relaxation and active blood circulation; morning luncheon with hot drinks; and an elevator to carry children to the roof.

Eight psychological tests were given at the beginning and eight similar or identical tests at the end of each year. Complete information as to the nature of and methods of administering and scoring some of these tests is lacking, consequently scarcely more than a list of them can be given here:

1. *Memory of Forms.* A triangle, a half-moon, a cross, etc., arranged in various positions were exposed for twenty seconds, and then the children were asked to draw them. The score was the number reproduced.

[1] "Effect of Outdoor and Indoor School Life on the Physical and Mental Condition of School Children."

2. *Memory of Forms.* Same test as above scored by the correctness of position of the reproduced forms.

3. *Memory of Passage.* A passage of about 100 words was read and the children were asked to write in eight minutes as many ideas as they could remember. The score was the number of ideas reproduced.

4. *Perception of the Letter A.* This was the ordinary Cancelling A test. The score was the number of A's cancelled in sixty seconds.

5. *Addition.* The score was the number of single-digit columns of nine figures each added correctly in five minutes. The tests were those used by Kirby, Thorndike, and others.

6. *Definitions.* Thirty seconds were allowed for defining each word. The definition received full or partial credit according to its excellence. The pupil's score was the sum of these credits.

7. *Disarranged Sentences.* The task of the pupil was to rearrange words so they would make sentences. The time allowed was two minutes. The pupil's score was the sum of the full or partial credit received on each sentence.

8. *Opposites.* The children were to write as many opposites out of a total of twenty as they could in sixty seconds. Each opposite was scored 1, .5, or 0. The sum of these made the pupil's score.

Two Memory of Forms tests were given. The tests were similar but not identical. The results have been combined and treated as one test. Two similar Opposites tests have also been combined into one. In a few cases a test or its method of administration did not remain the same throughout the four years. In such cases it has always been possible by statistical treatment or by rescoring to secure comparability from year to year.

The results are summarized in Tables I to VIII on the following pages:

TABLE I—MEMORY OF FORMS (NUMBER DONE)

Grade	*1912–1913*	*1913–1914*	*1914–1915*	*1915–1916*	*Average*
III (Indoor)					
1st test	8.73	7.15	7.46	6.59	7.48
2nd test	9.44	6.53	7.58	7.49	7.76
Improvement	.71	− .62	.12	.90	.28
III (Open-Air)					
1st test	9.14	8.21	7.46	5.57	7.60
2nd test	11.20	7.34	9.08	5.50	8.28
Improvement	2.06	− .87	1.62	− .07	.68
Difference	+1.35	− .25	+1.50	− .97	+ .40
IV (Indoor)					
1st test	9.34	8.03	8.40	6.56	8.08
2nd test	10.51	8.01	9.71	7.52	8.93
Improvement	1.17	− .02	1.31	.96	.85
IV (Open-Air)					
1st test	9.80	5.94	8.38	6.40	7.63
2nd test	11.77	7.70	7.63	7.26	8.59
Improvement	1.97	1.76	− .75	.86	.96
Difference	+ .80	+1.78	−2.06	− .10	+ .11
V (Indoor)					
1st test		9.05	7.95	7.75	8.25
2nd test		8.27	9.71	8.86	8.94
Improvement		− .78	1.76	1.11	.69
V (Open-Air)					
1st test		7.50	8.00	7.46	7.65
2nd test		8.31	8.39	9.48	8.72
Improvement		.81	.39	2.02	1.07
Difference		+1.59	−1.37	+ .91	+ .38
Average—All Grades					
Indoor					
1st test	9.04	8.08	7.93	6.97	7.91
2nd test	9.98	7.60	9.00	7.95	8.51
Improvement	.94	− .48	1.07	.98	.60
Open-Air					
1st test	9.47	7.22	7.95	6.48	7.62
2nd test	11.48	7.78	8.37	7.41	8.51
Improvement	2.01	.56	.42	.93	.89
Difference	+1.07	+1.04	− .65	− .05	+ .29 S.D. .38

Table I, as well as subsequent tables of this kind, is practically self-explanatory. A negative *improvement* for any class does not necessarily mean that the class has actually gone backward. The second test may have been more difficult. A plus quantity after *difference* means that the open-air class has made greater im-

provement than its corresponding indoor class and a negative quantity means just the reverse.

The summary for all grades, at the bottom of the table, does not come from the right hand column of averages but from the eleven individual experiments. This method gives equal weight to each of the eleven experimental or control classes irrespective of grade or year. The lowest right-hand figure, +.29, is the culminating point of the entire table and is therefore the most significant figure. The S.D. or reliability of this final difference is .38. Were the +.29 a minus quantity it would mean that indoor life is more favorable to this mental function than outdoor life. Were it zero it would mean that one is neither better nor worse than the other. A difference of +.29 is so small that the chances that the true difference might be zero or a negative quantity are large. We could not be certain that +.29 would not become zero unless the difference between +.29 and zero were three times the S.D. of +.29, in this case +.38.

Table I may be summarized in two points:

1. Of the 11 differences, 6 favor open-air and 5 indoor.
2. The final difference shows a slight but unreliable superiority for open-air.

TABLE II—MEMORY OF FORMS (POSITION)

Grade	*1912–1913*	*1913–1914*	*1914–1915*	*1915–1916*	*Average*
III (Indoor)					
1st test	6.13	4.35	3.28	4.91	4.67
2nd test	8.10	5.67	3.52	4.69	5.50
Improvement	1.97	1.32	.24	− .22	.83
III (Open-Air)					
1st test	4.32	4.25	2.79	2.71	3.52
2nd test	6.57	5.58	3.38	4.29	4.96
Improvement	2.25	1.33	.59	1.58	1.44
Difference	+ .28	+ .01	+ .35	+1.80	+ .61
IV (Indoor)					
1st test	5.89	5.69	5.24	4.24	5.27
2nd test	5.45	6.25	4.26	6.27	5.56
Improvement	− .44	.56	− .98	2.03	.29
IV (Open-Air)					
1st test	6.35	1.28	5.38	4.30	4.33
2nd test	6.40	4.41	3.50	7.70	5.50
Improvement	.05	3.13	−1.88	3.40	1.17
Difference	+ .49	+2.57	− .90	+1.37	+ .88
V (Indoor)					
1st test		4.95	6.13	4.95	5.34
2nd test		5.39	5.25	7.45	6.03
Improvement		.44	− .88	2.50	.69
V (Open-Air)					
1st test		3.29	6.15	5.00	4.81
2nd test		6.07	5.55	4.31	5.31
Improvement		2.78	− .60	− .69	.50
Difference		+2.34	+ .28	−3.19	− .19
Average—All Grades					
Indoor					
1st test	6.01	5.00	4.88	4.70	5.07
2nd test	6.78	5.77	4.34	6.14	5.66
Improvement	.77	.77	− .54	1.44	.59
Open-Air					
1st test	5.34	2.94	4.77	4.00	4.17
2nd test	6.49	5.35	4.14	5.43	5.25
Improvement	1.15	2.41	− .63	1.43	1.08
Difference	+ .38	+1.64	− .09	− .01	+ .49 S.D. .46

1. Of the 11 differences, 9 favor open-air and 2 favor indoor. Tables I and II combined give a total of 15 points to 7 in favor of open-air.

2. The final difference shows a small but unreliable superiority for open-air. Tables I and II combined favor open-air, 2 to 0. This simply means that out of two chances to excel indoor has lost both.

TABLE III—MEMORY OF PASSAGES

Grade	*1912–1913*	*1913–1914*	*1914–1915*	*1915–1916*	*Average*	
III (Indoor)						
1st test	4.70	3.09	3.05	5.82	4.16	
2nd test	5.77	4.70	3.84	6.70	5.25	
Improvement	1.07	1.61	.79	.88	1.09	
III (Open-Air)						
1st test	6.79	2.92	4.00	2.71	4.11	
2nd test	7.12	4.42	3.33	5.43	5.08	
Improvement	.33	1.50	− .67	2.72	.97	
Difference	− .74	− .11	−1.46	+1.84	− .12	
IV (Indoor)						
1st test	7.73	5.58	4.48	7.89	6.42	
2nd test	6.63	6.26	5.05	9.11	6.76	
Improvement	−1.10	.68	.57	1.22	.34	
IV (Open-Air)						
1st test	8.00	4.94	5.67	6.35	6.24	
2nd test	7.85	5.63	5.56	8.50	6.88	
Improvement	− .15	.69	− .11	2.15	.64	
Difference	+ .95	+ .01	− .68	+ .93	+ .30	
V (Indoor)						
1st test		7.64	7.14	8.70	7.83	
2nd test		8.50	6.95	9.10	8.18	
Improvement		.86	− .19	.40	.36	
V (Open-Air)						
1st test		7.57	5.20	8.85	7.21	
2nd test		7.67	6.10	8.77	7.51	
Improvement		.10	.90	− .08	.31	
Difference		− .76	+1.09	− .48	− .05	
Average—All Grades						
Indoor						
1st test	6.22	5.44	4.89	7.47	5.98	
2nd test	6.20	6.49	5.28	8.30	6.60	
Improvement	− .02	1.05	.39	.83	.62	
Open-Air						
1st test	7.40	5.14	4.96	5.97	5.73	
2nd test	7.49	5.90	5.00	7.56	6.40	
Improvement	.09	.76	.04	1.59	.67	
Difference	+ .11	− .29	− .35	+ .76	+ .05	S.D. .29

1. Out of 11 differences, 5 favor open-air and 6 favor indoor. The total points now stand 20 to 13 in favor of open-air.

2. The final difference shows a small but exceedingly unreliable superiority for open-air. The total points now stand 3 to 0 in favor of open-air.

TABLE IV—PERCEPTION OF THE LETTER A

Grade	*1912–1913*	*1913–1914*	*1914–1915*	*1915–1916*	*Average*	
III (Indoor)						
1st test	28.20	22.25	23.50	24.22	24.54	
2nd test	35.55	27.42	27.55	34.81	31.33	
Improvement	7.35	5.17	4.05	10.59	6.79	
III (Open-Air)						
1st test	28.64	26.50	21.64	21.29	24.52	
2nd test	36.14	30.58	33.55	26.43	31.68	
Improvement	7.50	4.08	11.91	5.14	7.16	
Difference	+ .15	−1.09	+7.86	−5.45	+ .37	
IV (Indoor)						
1st test	32.77	25.58	26.10	28.70	28.29	
2nd test	40.14	30.16	33.05	33.43	34.20	
Improvement	7.37	4.58	6.95	4.73	5.91	
IV (Open-Air)						
1st test	35.60	28.06	28.44	32.30	31.10	
2nd test	40.80	34.50	36.78	35.10	36.80	
Improvement	5.20	6.44	8.34	2.80	5.70	
Difference	−2.17	+1.86	+1.39	−1.93	− .21	
V (Indoor)						
1st test		34.77	32.52	33.06	33.45	
2nd test		37.41	36.05	41.56	38.34	
Improvement		2.64	3.53	8.50	4.89	
V (Open-Air)						
1st test		39.00	30.50	34.38	34.63	
2nd test		41.33	37.90	42.77	40.67	
Improvement		2.33	7.40	8.39	6.04	
Difference		− .30	+3.87	− .11	+1.15	
Average—All Grades						
Indoor						
1st test	30.49	27.53	27.37	28.66	28.33	
2nd test	37.85	31.66	32.22	36.60	34.29	
Improvement	7.36	4.13	4.85	7.94	5.96	
Open-Air						
1st test	32.12	31.19	26.86	29.32	29.67	
2nd test	38.47	35.47	36.08	34.76	35.99	
Improvement	6.35	4.28	9.22	5.44	6.32	
Difference	−1.01	+ .15	+4.37	−2.50	+ .36	S.D.1.00

1. Of the 11 differences 5 favor open-air and 6 favor indoor, making a total of 25 to 19 in favor of open-air.

2. The final difference shows a small and unreliable superiority for open-air. The points now are 4 for open-air and 0 for indoor.

TABLE V—ADDITION

Grade	*1912–13*	*1913–14*	*1914–15*	*1915–16*	*Average*	
III (Indoor)						
1st test	2.30	2.67	2.09	3.47	2.63	
2nd test	3.15	4.50	4.39	5.16	4.30	
Improvement	.85	1.83	2.30	1.69	1.67	
III (Open-Air)						
1st test	2.00	1.83	1.83	1.57	1.81	
2nd test	5.57	3.42	4.75	8.00	5.44	
Improvement	3.57	1.59	2.92	6.43	3.63	
Difference	+2.72	− .24	+ .62	+4.74	+1.96	
IV (Indoor)						
1st test	4.14	5.00	3.48	5.56	4.54	
2nd test	6.24	7.47	10.14	7.71	7.89	
Improvement	2.10	2.47	6.66	2.15	+3.35	
IV (Open Air)						
1st test	4.00	4.63	7.00	5.70	5.33	
2nd test	9.30	7.44	8.11	9.00	8.46	
Improvement	5.30	2.81	1.11	3.30	3.13	
Difference	+3.20	+ .34	−5.55	+1.15	− .22	
V (Indoor)						
1st test		9.50	7.52	9.50	8.84	
2nd test		9.23	9.71	10.75	9.90	
Improvement		− .27	2.19	1.25	1.06	
V (Open-Air)						
1st test		7.05	6.70	9.31	7.69	
2nd test		13.76	10.05	9.77	11.19	
Improvement		6.71	3.35	.46	3.51	
Difference		+6.98	+1.16	− .79	+2.45	
Average—All Grades						
Indoor						
1st test	3.22	5.72	4.36	6.18	5.02	
2nd test	4.70	7.07	8.08	7.87	7.13	
Improvement	1.48	1.35	3.72	1.69	2.11	
Open-Air						
1st test	3.00	4.50	5.18	5.53	4.69	
2nd test	7.44	8.21	7.64	8.92	8.10	
Improvement	4.44	3.71	2.46	3.39	3.41	
Difference	+2.96	+2.36	−1.26	+1.70	+1.30	S.D. .93

1. Of the 11 differences, 8 favor open-air and 3 favor indoor, making a total of 33 points for open-air and 21 for indoor.

2. The final difference favors open-air and with a higher reliability than previously. The reliability is not high enough, however, to give practical assurance that the difference would never become zero. Open-air now has a total of 5 points to 0 points for indoor.

TABLE VI—DISARRANGED SENTENCES

Grade	*1912–1913*	*1913–1914*	*1914–1915*	*1915–1916*	*Average*	
III (Indoor)						
1st test	11.95	13.50	11.76	8.42	11.41	
2nd test	13.26	14.60	14.71	12.03	13.65	
Improvement	1.31	1.10	2.95	3.61	2.24	
III (Open-Air)						
1st test	11.50	12.17	11.14	7.57	10.59	
2nd test	15.36	13.08	16.43	9.14	13.50	
Improvement	3.86	.91	5.29	1.57	2.91	
Difference	+2.55	− .19	+2.34	−2.04	+ .67	
IV (Indoor)						
1st test	13.36	14.40	14.22	11.32	13.33	
2nd test	14.41	15.33	16.17	9.20	13.78	
Improvement	1.05	.93	1.95	−2.12	.45	
IV (Open-Air)						
1st test	12.40	13.81	13.29	10.90	12.60	
2nd test	15.70	14.00	15.14	10.90	13.93	
Improvement	3.30	.19	1.85	.00	1.33	
Difference	+2.25	− .74	− .10	+2.12	+ .88	
V (Indoor)						
1st test		14.89	15.07	11.80	13.92	
2nd test		15.26	16.00	12.25	14.50	
Improvement		.37	.93	.45	.58	
V (Open-Air)						
1st test		15.32	15.07	10.54	13.64	
2nd test		15.21	15.93	13.77	14.97	
Improvement		− .11	.86	3.23	1.33	
Difference		− .48	− .07	+2.78	+ .74	
Average—All Grades						
Indoor						
1st test	12.66	14.26	13.68	10.51	12.79	
2nd test	13.84	15.06	15.62	11.16	13.93	
Improvement	1.18	.80	1.94	.65	1.14	
Open-Air						
1st test	11.95	13.77	13.17	9.67	12.15	
2nd test	15.53	14.10	15.83	11.27	14.06	
Improvement	3.58	.33	2.66	1.60	1.91	
Difference	+2.40	− .47	+ .72	+ .95	+ .77	S.D. .48

1. Of the 11 differences, 5 favor open-air and 6 favor indoor. The cumulative points are now 38 for open-air and 27 for indoor.

2. The final difference again favors open-air with another substantial reliability. The points are 6 for open-air and 0 for indoor.

TABLE VII—OPPOSITES

Grade	*1912–1913*	*1913–1914*	*1914–1915*	*1915–1916*	*Average*	
III (Indoor)						
1st test	7.29	8.04	6.79	8.59	7.68	
2nd test	15.53	14.08	12.12	16.88	14.65	
Improvement	8.24	6.04	5.33	8.29	+6.97	
III (Open-Air)						
1st test	7.46	8.17	6.75	5.71	7.02	
2nd test	18.14	14.21	13.65	13.71	14.93	
Improvement	10.68	6.04	6.90	8.00	7.91	
Difference	+2.44	.00	+1.57	− .29	+ .94	
IV (Indoor)						
1st test	10.59	14.32	10.36	12.77	12.01	
2nd test	18.61	19.18	20.00	18.60	19.10	
Improvement	8.02	4.86	9.64	5.83	7.09	
IV (Open-Air)						
1st test	13.70	10.88	10.50	11.70	11.70	
2nd test	22.40	18.91	19.56	17.45	19.58	
Improvement	8.70	8.03	9.06	5.75	7.88	
Difference	+ .68	+3.17	− .58	− .08	+ .79	
V (Indoor)						
1st test		16.45	15.88	18.95	17.09	
2nd test		21.24	22.55	26.05	23.28	
Improvement		4.79	6.67	7.10	6.19	
V (Open-Air)						
1st test		20.93	13.03	17.96	17.30	
2nd test		25.38	20.58	28.42	24.79	
Improvement		4.45	7.55	10.46	7.49	
Difference		− .34	+ .88	+3.36	+1.30	
Average—All Grades						
Indoor						
1st test	8.94	12.94	11.01	13.44	11.82	
2nd test	17.07	18.17	18.22	20.51	18.62	
Improvement	8.13	5.23	7.21	7.07	6.80	
Open-Air						
1st test	10.58	13.33	10.09	11.79	11.53	
2nd test	20.27	19.50	17.93	19.86	19.31	
Improvement	9.69	6.17	7.84	8.07	7.78	
Difference	+1.56	+ .94	+ .63	+1.00	+ .98	S.D. .42

1. Of the 11 differences, 6 favor open-air and 4 favor indoor, and on one they are equal. The total points thus far stand 44 for open-air and 31 for indoor, and the two are equal on 1 point.

2. The final difference is, as it has been in every case, in favor of open-air.

TABLE VIII—DEFINITIONS

Grade	*1912–1913*	*1913–1914*	*1914–1915*	*1915–1916*	*Average*	
III (Indoor)						
1st test		3.42	1.82	3.06	2.77	
2nd test		3.00	2.67	2.97	2.88	
Improvement		− .42	.85	− .09	.11	
III (Open-Air)						
1st test		2.00	2.36	2.29	2.22	
2nd test		2.42	2.55	2.14	2.37	
Improvement		.42	.19	− .15	.15	
Difference		+ .84	− .66	− .06	+ .04	
IV (Indoor)						
1st test		2.58	2.76	2.67	2.67	
2nd test		3.11	3.14	2.89	3.05	
Improvement		.53	.38	.22	.38	
IV (Open-Air)						
1st test		3.08	1.78	3.60	2.82	
2nd test		3.38	3.41	3.40	3.40	
Improvement		.30	1.63	− .20	.58	
Difference		− .23	+1.25	− .42	+ .20	
V (Indoor)						
1st test		3.29	2.65	3.10	3.01	
2nd test		3.24	2.73	3.15	3.04	
Improvement		− .05	.08	.05	.03	
V (Open-Air)						
1st test		3.10	2.63	3.54	3.09	
2nd test		3.81	3.37	2.85	3.34	
Improvement		.71	.74	− .69	.25	
Difference		+ .76	+ .66	− .74	+ .23	
Average—All Grades						
Indoor						
1st test		3.10	2.41	2.94	2.82	
2nd test		3.12	2.85	3.00	2.99	
Improvement		.02	.44	.06	.17	
Open-Air						
1st test		2.72	2.26	3.14	2.71	
2nd test		3.20	3.11	2.79	3.04	
Improvement		.48	.85	− .35	.33	
Difference		+ .46	+ .41	− .41	+ .16	S.D. .23

The Definitions test was so scored in the 1912–1913 experiment that the results could not be used with the results from subsequent experiments.

1. Of the 9 differences, 4 favor open-air and 5 favor indoor. All the tables give a combined total of 48 points for the open-air to 36 points for indoor, with the two equal on 1 point.

2. The final difference of +.16 is small and unreliable, but it still favors the open-air classes. While all the 8 final differences have been small, all show greater growth for the outdoor classes (to be more exact, outdoor plus open-window).

Our next step has been to combine the final differences of all the tables into one grand total difference for all classes, grades and years. The smallest of all these differences is +.05 and the largest is +1.30, yet it is possible that +.05 is really a greater superiority for open-air than +1.30. If, for example, the average improvement for indoor were 1.0 and for open-air 2.0, the difference would be +1.0 in favor of open-air. If, on the other hand, the improvement for indoor were 100 and for outdoor 101, the difference would still be +1.0 in favor of open-air. But it is obvious that the superiority in the latter case is far less than in the former. So, before the differences could be combined it was necessary to equate them. The method employed to do this was to express each difference as a ratio of the average yearly improvement for all the indoor and outdoor classes in the particular test in question. These ratios, with their average and the S.D. of this average, are given in Column 1 of Table IX.

TABLE IX

A SUMMARY OF THE EQUATED DIFFERENCES

	Experiments	*Grades*	*Years*	*Average*
Definitions	.640	.640	.640	.640
Memory of Forms (Position)	.583	.524	.565	.557
Disarranged Sentences	.507	.517	.566	.530
Addition	.471	.514	.518	.501
Memory of Forms (Number done)	.387	.397	.438	.407
Opposites	.134	.139	.139	.137
Memory of Passages	.077	.069	.102	.083
Percept. of A	.059	.072	.040	.057
Average—All Tests	*.357*	*.359*	*.376*	*.364*
S. D. of Average	*.077*	*.076*	*.080*	*.077*

Throughout the previous discussion the eleven separate class experiments, irrespective of grade or year, have been considered

the best single basis upon which to calculate the final difference for any test. The absence of data for the fifth grade in 1912–1913 makes two other bases possible. Instead of giving equal weight to each of the eleven classes, we might have given equal weight to each of the four years or to each of the three grades. Columns 2 and 3 in Table IX are the results from the use of these two bases. Column 4 is the average of all three bases, and the average of it, +.364, we have accepted as the measure of the superiority of outdoor classes. This means that the average open-air class exceeded the average indoor class by about one-third of a year's growth.

Is this final difference of +.364 reliable? On the assumption that the mental functions measured by our tests are random samplings from all mental function, we have calculated that the S.D. of +.364 is .077. *This means that when every test is considered we can be practically certain that the greater growth of the open-air classes is real. The chances are 1,000,000 to 3 that it is not accidental.*

Is the greater growth just mentioned due to open-air or to other factors? We turn now to the examination of the more serious criticisms which might be urged against open-air as the cause.

1. Was not the superiority of the open-air classes really due to the superiority of the fifth grade open-air class?

It was not. The open window was superior to indoor, but it happens that its superiority is just exactly the same as the average of open-air and open-window, the figures being +.365 for the open-window and +.364 for both combined.

2. Was not the superiority of open-air due to combining different grades upon which open-air or indoor life operated differently?

It was not. Open-air affected the three equally or nearly so. The superiority of the third grade was +.322, of the fourth grade +.379, and of the fifth grade +.358. One might see in these results a cumulative effect of open-air with a slight decrease when the children went from the outdoor into the open-window classroom.

3. Was not the superiority of open-air due to better teaching in the outdoor classes?

We cannot say. No attempt was made to eliminate the teacher variable experimentally. The novelty of the situation may have called out a greater effort from the open-air teachers. The differences for the four years were in order: .678, .679, .118, .053. This does not prove but hints at the wearing off of the novelty.

4. Was not the superiority due to an original selection of healthier children for the open-air classes?

On this point we quote Dr. Keyes who made the physical examinations: "In admitting children to these classes the preference was given to those children who seemed to be less robust than their classmates, those who had not gained during the previous year as much as was desirable, those whose past histories showed either physical or nervous weakness or severe illnesses; in short, those children who seemed to be especially in need of the most health-giving surroundings." A carping critic might argue the other way and say: The open-air groups made the greater progress because of the greater delicacy of their health since this delicacy was produced by a greater fondness for intellectual pursuits, especially those in the nature of psychological tests.

The carping critic cannot, however, be dismissed so easily. It is possible that the physical handicap of the open-air groups had temporarily repressed the mental capacity of these pupils below their natural level. The removal of these handicaps by open-air life might produce a sudden growth denied to the non-repressed indoor groups. According to the present hypothesis, this sudden growth plus the normal annual growth gave the open-air groups an apparent superiority over the indoor pupils, whereas if the open-air pupils had been normally healthy they would not have profited by such peculiar mental rebound. If this theory has any validity we would expect a progressively smaller superiority for the open-air for each successive year. And with one exception this is just what we do find, the superiority for each successive year being .678, .679, .118 and .053. While the above is very possible, we should remember that there is no sure evidence that an improvement in health produces any sudden and temporary mental growth, and if such evidence did exist we have no such proof that the health of these pupils was

more improved by open-air than it would have been by indoor life. Enough has been said to point out the possibility of drawing fallacious conclusions from experimentation with incomparable groups.

5. Was not the superiority due to a higher native intelligence on the part of the open-air groups?

The only measure we have of this is the average initial scores shown in Tables I through VIII. These show that in all the tests the open-air classes had smaller initial scores. This does not indicate any intellectual superiority but rather the reverse. It is scarcely probable the influence of age was large enough to account for more than this difference, thereby giving the open-air group a really larger initial score.

6. Was not the superiority due to a smaller average age for the open-air group?

It might be urged that the younger a pupil the greater the absolute improvement made in a year. But the open-air classes not only started lower in all eight tests but they *ended higher* than the indoor groups in five tests and were equal in a sixth.

7. Was not the mental superiority compensated for by equal physical losses?

It is hoped Dr. Keyes will present the full facts later. A few relevant points are taken from his summary of the first year's results. Out of 13 physical measurements the outdoor second grade made a greater gain than the indoor second grade in 10 measurements, made an equal gain in 1, and a less gain in 2. Out of 11 physical measurements, the third grade open-air improved more in 6, less in 4, and was equal in 1. Of 11 measurements upon the fourth year grade, the open-air class excelled in 2, was excelled in 8, and was equal in 1. This is sufficient to indicate that the first year's results give no evidence of less physical improvement to compensate for greater mental growth. To what extent both the physical and mental measurements are inadequate or fail to be true random samples we cannot say.

8. Was not the mental superiority compensated for by equal losses in the formal school subjects?

Professor Pearson, of the Horace Mann School, has kindly supplied us with some evidence on this point. He gave a test in formal English and another in formal arithmetic to the experi-

mental classes at the beginning and at the end of the first school year. The results show that every open-air class without exception made a greater improvement than its corresponding indoor class.

In conclusion, we can say with perfect assurance that the open-air groups combined made greater progress in the tested functions than did the indoor groups. Because of the numerous variables which were not eliminated experimentally we cannot be sure that open-air life must be credited with this greater progress. But a strong presumption has been created in favor of concluding that open-air life was mainly responsible.

The recent researches of Thorndike, Chapman, McCall, Ruger, and Stecher for the Ventilation Commission of New York were in agreement in assigning little or no measurable mental influence to various types of ventilation. This absence of positive results should make us scrutinize our conclusion with some care. The Chinese burned their houses to roast their pigs. Our experimental groups may have made greater progress not because of open-air but because of certain attending circumstances. The real factor may have been the low winter temperature, causing frequent physical exercises, causing in turn a vigorous blood circulation. If these or other factors which could be provided indoors were the real ones it is not necessary to burn our school buildings to educate our children.

HOME ECONOMICS STUDIES IN GRADES SEVEN TO TWELVE[1]

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(*Continued from the May number*)

PART III

HOME ECONOMICS STUDIES BASED ON THE 6–3–3 PLAN OF ORGANIZATION

A. HOME ECONOMICS STUDIES IN THE 7–8–9 YEARS BASED UPON INDUSTRIAL ARTS IN GRADES 1–6

Aim. In the modern movement for the reorganization of the school system upon the 6–3–3 basis, there are naturally to be found two groups of girls in attendance at the junior high school, namely:

(*a*) Those girls who will continue their school work through the senior high school and

(*b*) Those girls whose school training will end with the work of the junior high school.

Therefore in planning the course of study in home economics for the junior high school, provision must be made for both groups; and both groups should be handled in the same classes, in the seventh and eighth years, before the girls or their parents are able to decide definitely the possibilities for further education. This work in the judgment of the writers is as fundamental for the seventh and eighth grades as the study of industrial arts is in the first six grades. Therefore we believe that free election of home economics studies before the ninth grade is not desirable.

I. HOME ECONOMICS STUDIES FOR 7–8–9 YEARS, FOR GIRLS WHO WILL PROCEED TO SENIOR HIGH SCHOOL

Again, as in the 8–4 scheme of organization, the work in home economics in the seventh and eighth years should have as

[1] In this issue are printed together Parts III and IV of the article which was begun in the March RECORD and continued in the May number.

its aim the rounding out of the girl's general education. The content of the course should be based upon those interests and activities connected with the home which should enter into the education of every woman, because of the universality of such problems in their lives.

Because of the universality of vital problems of home-making in the lives of all women, and because of the immaturity and lack of sufficient basis for choice in the girl of this age, it seems advisable for the work of the seventh and eighth years to be required of all girls, and the work made valuable for all by its strong body of subject matter and its vital relationships. (See page 235–239, May RECORD, for correlation.)

It is recognized that often by the ninth year, and after the seventh and eighth years of general training in home economics, girls sometimes show a strong inclination toward one line of work rather than another—foods rather than textiles, etc.—and that the school organization should permit them to specialize along the line of greatest interest.

In planning a three years' course in home economics for those girls in the junior high school who will proceed to the senior high school, the sequence of subjects should be determined by:

(*a*) The natural interests and powers of the girl in the various phases of the work.

(*b*) The basis in art, science, and social studies which she has had or may be having upon which the home economics courses may build.

For example, the girl in the seventh year is generally less interested in studying art in relation to herself than the girl of the ninth year; and, furthermore, she has less understanding of the art principles which lie back of such a study than has the girl of the ninth year whose art training has equipped her to interpret and to apply the effect of horizontal and vertical lines upon the human figure. In the study of foods and sanitation, the seventh year girl will be interested in cooking and other household processes for their own sake; but she is not normally so interested in considering problems of nutrition and the food requirements of individuals as the girl in the ninth year; nor has she the scientific basis upon which to draw for principles underlying such a study until she has first been carefully guided through a course

which introduces her into the realm of chemistry and physics of everyday life, as the modern introductory science course is designed to do.

It seems desirable that at least two double periods per week and, when possible, three, be devoted to the laboratory work in home economics and that one or two single periods be provided for discussion; the time to be distributed among the various phases according to the needs of the problems in hand.

It is not the purpose of this article to outline the specific phases of work to be covered in each year, but merely to suggest the careful organization of a course for 7–8–9 years sufficiently broad in scope and of adequate intensity to render every girl capable of meeting her home problems with intelligence and a consciousness of power.

Furthermore, the course in home economics in the junior high school should afford a basis for selecting the phase of work which the girl may wish to pursue in a more advanced form in the senior high school. The teacher in the junior high school has as one of her responsibilities the task of discerning skill and special aptitude in her pupils; and of guiding them in their choice of the senior high school courses, which, as will be seen, are designed to train the girls more intensively along the line of their major interest.

As has been suggested, the opportunity for more intensive work in the ninth year along one special line will facilitate this choice of specialized work in the senior high school.

In the organization of this period of work (7–8–9 years) for the group of girls who will take the work in a consecutive course for the purpose of general education, the section of this report dealing with Home Economics Studies in Grades 7–8 (pages 229–239, May RECORD), may be expanded and enriched to cover three years instead of two, with the introduction, as suggested above, of more advanced work in all phases based upon the contributing courses in science, art, and social studies.

It sometimes happens that by the time a girl has finished two years of general home economics training, she shows particular aptitude for one line of the work rather than the other—for the foods or for the textiles—or such lack of interest in one or the other that to continue it would be a waste of time. If the school

organization will permit, such girls may be allowed to elect the work of their greatest interest and to continue it more intensively through the senior high school than would be possible if they elected both phases. This differentiated course should not begin until the ninth year, since before that year the pupil has not arrived at an age when she is capable of making a wise choice, and may include one of the following phases of work:

1. *Food and Sanitation.* This would include a further application of the principles of cookery gained in the seventh and eighth grades and more specific science and economics through the preparation and service of well-balanced, nutritious meals at varying costs; general household management such as cleaning, laundering, etc., through the care of rooms, furnishings, and equipment incidental to the service of these meals; and ideals of hospitality and the relations of hostess and guests through these school exercises.

Practice in large quantity cookery may be given through the school lunch room, this being a possible outlet for surplus products as well as an incentive toward perfect results in the laboratory. It further offers opportunities for the study of costs, large and small quantity buying, and efficient business methods. The time to be allowed for this should be at least two double periods for the laboratory with one single period per week for discussion.

2. *Textiles and Clothing.* This is the age at which the girl is most subjective, when she takes greatest interest in her personal appearance, and a time which offers the richest opportunities for instilling right ideals toward dress, and right principles and habits of health and hygiene as influenced by dress. The course then may start with the girl's present interest in her own personal appearance by applying the art principles to costume design and the execution of garments from these designs; by making a study of color through what is best for her to enhance her good points and subdue the poor ones; and by applying her textile study to the selection of materials and trimmings for these dresses from the point of view of adaptability, durability, and hygiene. The remodelling of old garments for conservation purposes would give opportunity for the study of the economics of clothing and the proper cleansing of old fabrics, thus giving a place for the application of chemistry through a study of detergents and

reagents. A comparison of the cost of ready-made and home-made garments would give opportunity for discussion of problems of wage earners, the human cost of ready-made articles as compared with the mere cost of materials, the relations of the family to the day worker in the home, etc.

II. HOME ECONOMICS STUDIES FOR 7–8–9 YEARS, FOR THE GIRL WHO MUST LEAVE SCHOOL TO GO TO WORK

For the girl who must go to work at the end of the junior high school period, it is believed some kind of specialized training should be possible during the ninth year. This may or may not be related to the home economics studies, although this article is concerned only with these.

The home economics studies of the seventh and eighth grades for this group of girls, who must go to work at the end of the ninth year, should be pursued by all girls regardless of the vocation chosen for special study in the ninth year; for every girl no matter what line of work she may enter should have an opportunity to become acquainted with at least this amount of the subject which affects her so vitally as a girl and as a woman. The need for home economics work for these two grades is perhaps of greater importance to the girl who leaves school at the end of the ninth grade than for her who may continue in school, for it is not likely that further opportunity will be easily available. The content of the course during these two years should be about the same as that outlined upon page 370.

Differentiation should begin in the ninth year. From ten to fifteen hours per week should then be devoted to the girl's special line of study, but the regular academic studies of the ninth year should be continued although the school day will have to be lengthened during this year. The academic studies should be related as far as possible during this year to the special field of interest as this relationship tends very directly towards making the girl a more efficient person in her chosen field of work. The relation of her major subject to all other subjects studied should be clearly seen and felt and should leave no doubt in the girl's mind regarding their value to her.

It is quite natural that the home economics studies in the seventh and eighth grades in food, clothing, and household man-

agement should open up possibilities of vocational interest to girls, which may be pursued intensively during the ninth year. If the girl chooses during the ninth year, for vocational purposes, the vocational industrial studies related to home economics, these may lead to special fields of work in the needle trades, as dressmaking, garment-making, millinery, machine operating, etc., or to vocational industrial occupations in foods if the course for this ninth year is wisely planned.

The aim of the training during this ninth year is to prepare the girl directly for a special kind of work for 'gainful purposes' in order that the girl shall qualify along some line and that the period of apprenticeship may be shortened.

This work may or may not be related to the home economics field. The vocation chosen may be that of stenographer, office assistant, sales girl, telephone operator, etc. This training of the ninth year she may prefer to take in a trade or business school or in the vocational classes of a high school if the work she wishes is offered.

It must be remembered that the girl at this period is not old enough to be more than an assistant or an apprentice in any of these lines of work and must start at a low wage. Nevertheless, she will have more of general education by the end of the ninth year and in addition the special training which will enable her to advance more rapidly than she would otherwise do in her chosen field of work.

It is essential in this special work of the ninth year that the materials and equipment with which the girl works shall approximate industrial conditions as nearly as may be without duplicating their bad features, and that the student should be expected to qualify in speed and technique in such a manner as will make her a worthwhile assistant in the field of work which she enters.

There will be found in most schools over-age girls in the seventh and eighth grades who must leave school before completing the ninth year. It would often be advisable to permit such a group to follow some intensive vocational study which is being taken by ninth-year girls, but also to require them still to pursue academic studies of a lower grade. This group will probably be small but provision should be made for it.

B. HOME ECONOMICS STUDIES FOR THE SENIOR HIGH SCHOOL BASED UPON THE WORK OF THE JUNIOR HIGH SCHOOL

I. HOME ECONOMICS STUDIES FOR LIBERAL EDUCATION

In Part II of this series of articles, training for liberal education in home economics studies has been fully discussed and the content of courses suggested for the students with varying goals. In the senior high school of the 6–3–3 plan will be found students with similar goals, namely:

(*a*) The girl who expects to remain at home.

(*b*) The girl who expects to enter industrial, commercial, or agricultural pursuits, but who needs some home economics studies as a part of her liberal education which will teach her how to live while pursuing her main occupation.

(*c*) The girl whose goal is the college.

It is believed that the work as outlined in Part II under "Home Economics Studies for Liberal Education,"[1] may be interpreted as covering the needs of the girl in the senior high school; that the girl who expects to remain at home should be able to elect strong courses or units if she chooses; and that the girl whose goal is an industrial, commercial, or agricultural pursuit, and the girl whose goal is the college should find in the senior high school courses or units in home economics for liberal education which should attract her on account of their intrinsic value for her.

It is urged that an elastic system of courses or units be planned to meet these needs; for example, opportunity should be offered to the girl who wishes to select courses or units during any one or all of the years in her high school course; but, if only one year or its equivalent in units, is elected, that one should be a truly valid course in rounding out and summing up the best for the girl in the field of home economics at that stage of her development.

It seems to the writers that if only one year is added to the work of the junior high school, the eleventh or twelfth year is the wise time for such a nal course, inasmuch as the girl has reached her greatest maturity and has the best background in science, art, and economics besides a broader outlook upon life than at any previous time.

[1] page 239, May RECORD.

If it is not possible to give the full time recommended, five periods per week, for the full year in that year, and the unit system is adopted, it will be possible for the students to elect certain units in different years, and in this way aspects of the work demanding more maturity and serious purpose, such as nutritive value of foods and dietetics, budgets, etc., might be included in the twelfth year.

The course as suggested for the senior high school provides a very desirable basis for future specialized training in nursing. Because of the great need for nurses in the world to-day, the fitness of girls for this training should be carefully considered; for it is often through the home economics course that girls may be led to an interest in nursing. The high school course may wisely be modified to meet the needs of such students.

Such a course should emphasize cultural subjects, should be strong in science (chemistry, physics, biology), and should include as much of the practical work of home economics as would be possible without sacrificing the general cultural and science courses. It should have good courses in cookery—nutrition—housekeeping (cleaning and furnishing, etc.), and household sanitation. Mathematics could be reduced to a minimum for such a student, but she should have a modern language and one year of Latin if possible. She needs the full work in English and history with emphasis on civics.

II. HOME ECONOMICS STUDIES FOR VOCATIONAL TRAINING

The writers believe that the three years of work of the senior high school should be organized in a way similar to that suggested in Part II (for the four years of high school), under "Home Economics Studies for Vocational Training." It is suggested that the adaptation of the 8–4 plan to the 6–3–3 plan be made in the ninth and tenth years according to the needs of the girl.

In planning programs or courses of study for the senior high school, it is necessary to keep in mind girls with the following aims:

1. The girl who has as her goal *vocational education in homemaking* "as practised by the wife and mother in the home."

2. The girl who is preparing in high school to be a *teacher in a one-room rural school* and must include in her program some home economics studies because she will have to teach them.

3. The girl who chooses a *vocational industrial course*—an outgrowth of a home economics study.

The following suggestions are made for adjusting the three years of the senior high school to the programs suggested on page 239 for the four years of the 8–4 plan.

1. *For the girl whose goal is distinctly home-making.*

The course as outlined in Part II, page 250, suggests that the first two years of the course for vocational home-making intensify the work given during the first two years of the course on page 242 "for the girl who expects to remain at home." In order to adapt this to the senior high school of three years, it is suggested that in the first year of the senior high school or tenth grade the scope of the work remain about the same as that suggested on pages 242–245, half of the time being devoted to food study and the other half to clothing.

2. *For the girl who is preparing in high school to be a teacher in a one-room rural school* and who must include in her program some home economics studies because she will have to teach them.

For this type of student the plan suggested on page 252 in the 8–4 plan of organization, Part II, may be utilized since the subjects to be pursued are given in the last two years of high school and will not be affected by a difference in organization of the school.

3. *For the girl who chooses a vocational industrial course—an outgrowth of a home economics study.*

As suggested on page 255, Part II, there are vocational industrial pursuits which are an outgrowth of some of the home economics studies. In the 8–4 plan of organization it was recommended that the specialized study in preparation for these pursuits should not begin before the junior year of high school. In the 6–3–3 plan this recommendation may be transferred to the corresponding years, viz., the eleventh and twelfth years of school.

Recommendations in regard to the other factors that will contribute to the success of vocational industrial courses may be found in Part II, pp. 255–258.

PART IV

STANDARDS BY WHICH TO TEST METHODS; PREPARATION OF TEACHERS; AVAILABILITY OF MATERIALS FOR USE IN SECONDARY SCHOOLS

I. STANDARDS BY WHICH TO TEST METHODS

While the following statement was made by Dr. Frank M. McMurry concerning elementary school studies in general, it also may be applied to the home economics studies:

> We must look directly to the life about us to find what subject matter the school should offer, and how this should be treated. The curriculum will be good to the degree in which it contains problems—mental, moral, esthetic, and economic—that are socially vital and yet within the appreciation of the pupils; and the method of presenting that curriculum will be good to the degree in which it exemplifies the methods of solving problems found most effective by the world's most intelligent workers.

Dr. McMurry considers the following five factors, because of their universality, particularly worthy of acceptance as standards by which to judge method:

1. *Motive* on the part of pupils.
2. *Consideration of values* by pupils.
3. *Attention to organization* by pupils.
4. *Initiative* by pupils.
5. *Application* by pupils.

These factors may be interpreted in the teaching of home economics studies in the following theses:

1. *Home economics teaching is good in proportion as it makes its appeal to the pupil's own present interest as a member of her family group.*

The girl at all ages has her own special problems that are of vital importance to her—what color hair-ribbon to wear with her new dress; how to spend her small allowance to obtain the greatest return in satisfaction and happiness; what to make for mother's birthday gift, or to prepare for the surprise anniversary dinner—these and like problems, varying in degree with her age and development, are the foundation stones of interest on which to build that body of subject matter and projects which constitute the home economics field. To arrange the work on the basis of

the practice sewing piece to be repeated until a certain standard of excellence has been acquired before applying to any project, or on the study of each of the food principles in detail before their combination in the meal, is to exalt the technical aim and deaden the natural interest in an otherwise absorbing problem.

2. *Home economics teaching is good in proportion as it stimulates the pupil to want to know and to want to do, in coöperation with others, those things which are needed by the community of which she is a part* (city, state, nation, international relationships).

The desire to know and to do for one's self and one's immediate circle of family and friends is not necessarily a matter of education. It may be said to be instinctive. Upon this inherent interest the subject of home economics builds. The girl takes a natural interest in such a problem as this:

"What must a girl of my age know of food, clothing and cleanliness in order to help my family to keep well and strong and happy?"

The utilization of such personal interests is legitimate and indicative of good teaching, but the task is only 'well begun' and hence 'half done'. The widening of the field of interest may follow through such problems as these:

"What are our responsibilities outside the four walls of our home?" (The girl's interest should expand to include the activities concerning civic housekeeping, pure food, Consumer's League, child labor, war relief, etc.)

"How can I prepare myself to be a helpful factor in the community?"

The home economics studies are peculiarly fitted to function in the development of the social idea in the girl's life. Coöperation in classroom, home, and community is necessary for harmonious and effective work; and when taught with this ideal in mind, the home economics studies are bound to create in the girl the desire to know and to do, in coöperation with others, those things which are needed in the community of which she is a part.

3. *Home economics teaching is good in proportion as it teaches the pupils to weigh the values of various methods of attacking home*

problems, and as it cultivates independent effort in organization of work.

It is not sufficient that the pupil feel an interest in home and community problems directly related to home economics studies; she should also be able to participate in forwarding the interests of home and community in an intelligent way. She will count for most in home or community when she is able to distinguish essentials from non-essentials in a given situation, and is able to decide how to deal with them sensibly in her methods of work. This is a matter of learning how to choose, a weighing of the relative value and importance of things, a study of the relative worth of methods of procedure. Whether it is the mixing and baking of a cake or the making and trimming of a hat or gown, the cleaning of a room or the keeping of household accounts, relative values of methods of attacking the problem must be decided upon.

Not only must choice be made in relation to relative values of ways of doing things, but organization of ideas or system is necessary if the pupil's efforts are to be of most value to her community. Organization of ideas and facts leads to self-reliance and independent effort in work. It is not sufficient that the pupils know facts; they should be organized and labelled.

4. *Home economics teaching is good in proportion as it exemplifies methods found to be most effective for the type of home represented by the group.*

To this end it is essential to give such subject matter as it is practicable for the pupils to make use of in their own homes. It will be necessary to understand the social and economic needs of the group and to utilize such materials in all phases of the work as are consistent with the standards of living in the homes represented. To illustrate: for the type of girl whose family income warrants the purchase of high-priced food materials the kind of dish prepared might differ from that given to a group whose family income is limited, even though the principles involved in preparation would be the same. There would be little reason for teaching the Russian and English form of table service to a group whose simple meal may be eaten in the combination kitchen and dining-room.

In the sewing classes one is not warranted in insisting upon elaborate hand-made garments of fine and delicate fabrics when economy of time, effort, and material are paramount factors in determining the wardrobe. The use of the sewing machine in constructing simple, durable garments would seem to accord better with the ideals in teaching home economics.

Materials and equipment known to be beyond the means of the group had better not be considered, but the highest attainable ideals should be held.

When the school work is made to seem desirable and practicable to the parents as well as to the students, there will be less likelihood of its failure to function in the home.

Standards for measuring purposes, means, and results are like searchlights for the use of the teacher. She should turn them often upon her work so that they may guide her as they light the way. They should help her to see if her work with her children is measuring up to those standards and if it is not, they should influence the direction of her course of procedure. More and more shall we evolve better standards for our work in home economics teaching, but certainly if the above measures are used now the teaching results are bound to show in the improved methods of work in the homes of any community.

II. PREPARATION OF TEACHERS

There was a time in the early history of home economics when women especially skilled in the arts of sewing and cooking were considered quite competent to teach what was termed Domestic Science and Domestic Art or, generally speaking, cooking and sewing. These teachers were generally fine, practical women and did their large share of the pioneer work in this field and it is to their earnest effort that much of the success of establishing the work is due. With the changing attitude towards the content of the subject and with the change in educational theory, there has come the demand for professionally well-qualified teachers. There is now no longer a place in the school-room for the person who is simply technically efficient. She must have in addition to her technical training, not only a fund of related subject matter, but a knowledge of educational problems. She should have a knowledge of psychology and pedagogy and should be able to

apply educational theory to her practice to the same high degree that is demanded of the best teachers in the educational profession. While home economics is a special subject and the home economics teacher is a special teacher, there is no reason for isolating the subject or the teacher or for being satisfied with anything short of the best in organization and method of presentation.

Aside from her classroom duties the teacher should be quite as able to assume responsibility in school affairs and to take part in solving school problems as any teacher on the staff. The unusual opportunity for becoming acquainted with individual students and with various groups because of the nature of the subject should make her a person of strong influence in the school.

In addition to her work in the schoolroom it is expected that any teacher of home economics should take her place in the community as an active advocate of her subject, especially at the present time. There is great opportunity to exercise leadership in establishing boys' and girls' clubs and mothers' clubs whose aim should be the betterment of home and community conditions, especially in small towns and rural communities.

There should not only be a willingness, but a desire for the teacher to take her place as a citizen in the community, participating in its activities and coöperating with others in carrying forward all projects that make for better living.

It is important that all teachers realize the necessity for 'keeping up' with the progress being made in the home economics field of study as well as in general education. This kind of preparation for teaching can be made in summer schools and by attending teachers institutes or conventions. The American Home Economics Association, the National Education Association, the National Society for Vocational Education, state and other organizations, all furnish opportunities for keeping in touch with the latest thought as do their journals and publications of annual proceedings.

There is also an abundance of literature available: Government publications, current magazines on education, books on general education and special home economics topics. The teacher who wishes to keep abreast of the times should keep in touch with the latest trend of thought in the general as well as this special field of education.

1. *The training of teachers for upper elementary grades or junior high schools.*

The period of elementary education is not one of specialization. The aim of home economics instruction in the upper elementary or junior high school is not to produce specialists in any one line of work but to lay a broad, liberal foundation for the problems, activities, and duties of the home and community, and to give a degree of skill in home processes commensurate with the pupils' needs in their home life, or one on which the higher schools may build their more specialized and intensive studies. It follows, then, that the home economics teacher of the elementary school must have broad sympathies, be capable of appreciating the needs of her pupils, and be conversant with their environment and problems.

To this end it is necessary that her training be general in character rather than specific or intensive along narrow lines. Her knowledge of child study and psychology and her comprehension of the field of home economics should help her to understand her pupils at the various stages of their development and should assist in determining just what in the subject will make the strongest appeal to them at the particular time, and what will be the most forceful methods of presentation. Her sympathetic understanding of the other subjects in the curriculum will help her to link and correlate her work with that of the other instructors. Her training in the home economic studies should be broad and liberal rather than narrow and intensive. It should include thorough work in the sciences, natural and social, and in such phases of art and design, textiles and clothing, food, sanitation, and home management as will give her the underlying principles of each of the subjects, together with sufficient skill to teach the technical processes accurately, and a vision and an appreciation of the worth of these studies in the life of the girl for the development of character and high moral and social principles.

How shall this teacher be trained? She should have as a basis a high school course or its equivalent, followed by at least two years of normal or technical training in home economics, including methods of teaching the special subject, and practice teaching as well as the studies outlined above. The training should in

every case be as thorough and comprehensive as that demanded for the teacher in any other subject.

If the aim of the junior high school is to shorten the period of apprenticeship in trade, then it is desirable that the teacher of home economics should have had experience in the trades for which the school prepares in addition to her teacher training work, in order that she may know the demands of the industry and the most effective preparation to meet them.

2. The training of teachers for senior high schools.

As has already been indicated, the home economics studies in the senior high school will be more highly specialized than in the junior high school; and the aim will be for vocational ends or for preparation for advanced technical training.

The teacher of these more specialized phases of work should have had a four-year college course leading to the degree of Bachelor of Science, or the equivalent of such a course in an approved college or university offering home economics training. Such a course should include (1) technical training in home economics, with specialized work in the various phases to be presented, and the related sciences and art; (2) as many courses in literature, history, sociology, economics, and modern languages as time will allow; (3) strong courses in education, including psychology, child study, principles of teaching, and methods of teaching home economics.

In addition to her academic and technical training, the teacher of specialized work in home economics or vocational industrial studies should have had practical experience in her home and, if possible, in the field in which she teaches; for example, in order to teach a specialized course in dressmaking, it is desirable that the teacher have as a basis for the work actual experience in shop work; and in teaching, catering, or tea-room work, actual experience in these fields will render the teacher more capable of training her students intelligently to meet the needs of these vocations. In teaching vocational home-making, actual experience in the differentiated task of home-making is essential.

The teacher of home economics studies in the senior high school has a special responsibility in meeting the requirements of the technical institutions. It is essential that she know the require-

ments set by the various institutions to which her students go for advanced training; some course in education should furnish her with a basis for this knowledge in order that she may wisely direct those students who plan to take advanced work in home economics.

It seems especially essential that the teacher of home economics studies in the senior high school have a preparation for her work which will give her a broad vision of the relation of her subject to the rest of the curriculum as well as to interests of the community; and it is of paramount importance that the present and future welfare of her pupils be of greater interest to her than the development of the special subject which she is presenting.

3. *The training of the supervisor of home economics.*

By the supervisor of home economics is meant the one in charge of all the home economics teaching in a school or system of schools. She may have a number of assistant supervisors and teachers, or under some conditions she may have to do some teaching with few or no teachers to assist.

It is her duty to bring about the most effective organization of home economics studies possible and to see that they are presented to the pupils by the teachers according to the best modern methods, so as to attain the results and aims outlined for home economics studies in schools.

A person wishing to qualify for supervision of home economics should be a person of maturity. She should have had experience in teaching these studies as well as experience in the management of a home and knowledge of its practical activities. She should be a woman of good general scholarship and in addition should have had special training in home economics studies for a period of at least two years. She should also have the Bachelor of Science degree.

The general and special training should acquaint her with the best in modern educational theory and method and prepare her to apply these to the field of home economics teaching. She should be familiar with the arts and sciences related to the home economics studies as well as with the technical work of this field.

In addition to special preparation and training at normal school or college, certain personal qualifications are necessary

for one seeking appointment to the position of supervision. Tact, justice, adaptability, much patience, and executive ability with high ideals are necessary for success. Physical fitness is an absolutely necessary qualification, for such work requires untiring energy and strength.

III. AVAILABILITY OF MATERIAL FOR USE IN HIGH SCHOOLS

1. *Text-books.*

During the past few years the number of satisfactory text-books for home economics teaching has rapidly increased whereas, in years past, the trained teacher was forced to depend upon various sources for class reference reading and upon her own training almost entirely for the power to organize and present it. To-day there are many up-to-date text-books. The modern task lies in selecting a text-book which presents the material in home economics studies which is best adapted to the age of the pupils, to the type of work to be taught, and to the home and community interests. Even with the best of text-books, however, the teacher must exercise individuality and versatility in the adaptation of the text-book to the needs of her pupils; and she must adjust the sequence of her course and regulate the emphasis in the text to meet their demands.

There are two main classes of text-books available, namely:

(*a*) Text-books which give specific subject matter in relation to the various topics discussed.

(*b*) Text-books which serve as guides to the teacher and stimulus to the pupils in the method of procedure, in addition to presenting the subject matter of home economics in its numerous phases.

A reliable book of recipes is satisfactory as a text-book in food preparation under certain conditions. It provides the girl with a book which is valuable for present home use for herself and her mother, thus establishing a sympathetic understanding between them; and, in later years, will be even more helpful to the girl because of her familiarity with it and the scientific principles upon which the recipes are based. It is also valuable as a means of eliminating extensive note-book work. However, unless the recipe book is used by a teacher with broad vision and a full

appreciation of the scope of her subject, the course as presented is in danger of becoming decidedly limited in its scope.

A similar statement might be made concerning a book which gives the details of manipulation in sewing. The teacher's training must be such as to give her the ability to utilize such a text as a nucleus for a course, or as a text for a part of a more comprehensive course.

Similar to the type of book described are the text-books which give in clear concise form the principles involved in sewing, cooking, and cleaning processes, with practical applications of these processes. Although usually dependable in point of science and accuracy of statement, they must serve as a tool only in the hands of a versatile teacher, and must be interpreted in relation to the local conditions.

The text-book which more closely meets the needs of modern educational principles is that one which combines the clear, interesting statement of subject matter covering the recognized content of home economics, with suggested methods of presenting the subject discussed and interesting problems, queries, experiments, etc., introduced at psychological points in the text. As the reviewer of a recent text-book puts it, "There is a familiarity that loses nothing of conventionality, which is high art with pen or voice. There is a descent to minutest detail without dropping the dignity of science, which is even a rarer art." Such a book is very valuable in the hands of the teacher with limited training; and, furthermore, it may serve as a basis for the course presented by the well-trained, experienced teacher who will use it as an aid but not as a guide in her course, excepting in so far as she believes it to meet the specific needs of her pupils.

This modern text-book, when properly used, will dignify and strengthen the work in home economics teaching; and should be indispensable to the up-to-date teacher of home economics studies.

2. *General literature and other publications.*

Modern method encourages the help of all kinds of literature that contribute to the better or broader understanding of a subject. It is always satisfying to have recourse to more than a text-book offers, and especially so when the source of information is as reliable as may be found.

Home economics is especially favored in the help that the federal and the various state governments have contributed to its literature, and is indebted to many universities and colleges for a more intensive treatment of many subjects than any text-book can allow. It is very desirable that publications of this type be accessible to the high school student and that she be encouraged to make use of them. The addresses of all high schools should be on the government mailing lists so that the publications that deal with home economics subjects may be obtained.

The literature distributed by the agricultural extension departments frequently gives valuable information for home economics students, and while it is designed to give information for a given locality, much of it is applicable to other places as well. Upon application this literature is very generally distributed for school purposes.

Other publications, such as technical journals and magazines devoted to special subjects, will be of great help and interest to students and should be found on reference shelves or reading table.

The field of journalism is proving ever more attractive to experts in the field of home economics and much that is of value may be found in daily papers. One must be able to exercise good judgment in the selection of all popular articles, but it is well to have students become interested in reading and collecting literature which may be bulletined and later filed for reference.

Valuable contributions are continually being made to the subject of home economics and as these appear in pamphlet, magazine, or newspaper form they should be utilized as a valuable part of home economics literature.

3. *Illustrative material.*

No discussion of availability of materials for use in high schools would be complete without mention of illustrative material and its uses. The home economics subjects, perhaps more than any others, present both necessity and opportunity for the abundant use of illustrative material in class instruction. Ideas which are vague or processes which are difficult may be clarified and simplified by the introduction of charts or materials which

present in a graphic, forceful, pictorial way the salient points of the processes under discussion. For instance, the various changes wrought in fibers in their conversion from raw material into finished product—the cleaning, carding, roving, and spinning of cotton, or decorticating and hackling of flax—will be clearer and more easily understood if impressed by the showing of fibers at these different stages of preparation; the composition of foods and the relative proportion of constituents will be more quickly grasped and longer remembered if learned from charts showing the amounts of the various nutrients in staple articles; the division of income with relative proportions allowed for the several divisions of the budget will become more real if plotted out in color by the students on their own charts.

Much of the illustrative material possible to use in home economics instruction may be prepared in a simple and even crude way by the teacher, always keeping in mind that it must be accurate and large enough to be easily seen from all parts of the room. Such illustrations are time-savers as well, as they eliminate the necessity of much individual instruction. In addition much may be obtained from firms making a business of supplying such material, from the United States government which issues charts showing food composition, etc., and from certain industrial plants which put out as advertising matter excellent and helpful exhibits of the processes of manufacture necessary in their particular commodity.

It is not so much a question of availability with illustrative material as it is of industry and ingenuity on the part of the teacher in securing or preparing it and wisdom and intelligence in its selection and use. Each piece introduced should have definite bearing on the particular process or subject under discussion and should not be a mere device for filling up time or giving variety and novelty to a lesson.

(*Concluded*)

COLLEGE NEWS AND DEPARTMENTAL NOTES

DEAN RUSSELL TAKES UP IMPORTANT WAR WORK

Dean Russell has recently agreed to organize the Division of Education of the Department of Reconstruction of the Surgeon General's Office of the United States Army. His work began in Washington, May 20, and may require several months from that date for the completion of the task which he has undertaken. The Division of Education is one of four divisions of the Department of Reconstruction, the other three divisions representing respectively medicine, surgery, and physio-therapy. The purpose of the Division of Education is to organize instruction in occupational therapy, curative workshops, and vocational guidance for wounded soldiers convalescing in the army hospitals. Certain expert work in psychology is also attached to this division.

Dean Russell is undertaking this work as a civilian and expects after the work is fully organized to be relieved of further duties. The Trustees of Teachers College have granted him leave of absence for this work. During his stay in Washington Professor Monroe will act as dean.

WAR EMERGENCY COURSES

Teachers College expects her students to do their bit this summer toward winning the war and accordingly arranged a series of special lectures and condensed courses for all Teachers College students with the aim of preparing them to engage in some of the opportunities for war emergency service open during the summer vacation.

The series took the place of the regular college work for the last two weeks of the spring semester.

These courses aimed to be thoroughly practical and also to supplement the regular work of the year by an intensive study

of the special problems and duties connected with the several types of war service now open.

The chief opportunities available for college men and women during the summer are as follows:

1. American Red Cross work.
2. Y.M.C.A. and Y.W.C.A. home and overseas service.
3. The training of boy and girl scouts.
4. Day nursery and playground work for young children.
5. The organization of club work for young women.
6. Teaching housewives food preservation, the new economic cookery, wartime dietetics, the preservation and renovation of clothing and household thrift.
7. Teaching mothers child conservation and the care of infants.
8. The promotion of social hygiene in war time.
9. Automobile mechanics and repairing.
10. Agricultural work.
11. Physical reconstruction work in hospitals.
12. Social recreation for war centers and cantonments.
13. Patriotic propaganda through public speaking concerning war savings, liberty bonds, and food conservation.

The courses provided for gave either full preparation for the above activities or told one exactly how to get such preparation as might be necessary beyond that offered by Teachers College.

Among the lectures offered to promote thrift were those on the war savings campaign; budgets and savings, and the principles of saving, including war savings and liberty bonds.

Men and women of some maturity and experience in public speaking were assisted to equip themselves to give direct and forcible talks on patriotic issues, in schools, churches, political gatherings, and other places of public assemblage by means of a series of lectures and courses which included the discussion of the subject matter and methods of public talks, the use of the voice in public speaking, and the geographical background of the war.

There was also a course offered by the department of fine arts on patriotic propaganda through posters and printing, including experiments and shop-work. This was a short course

in printing posters and cards from linoleum and wood-blocks, and demonstrating with a large printing press, a copying press, and a home-made press. A further account of work of this department will be found under the Fine Arts note on page 396.

Emergency courses in language were offered in German and also in French, including drill in everyday phrases useful for students intending to do reconstruction, canteen, or nursing work in France.

The work in cookery included food conservation and demonstrations in scout cookery. Instruction was also given in repairing and renovating garments and retrimming hats. The physics department offered nine lectures and nine laboratory exercises dealing with the construction, operation and care of the automobile. The work included running the engine, manipulating the gears, assembling and dissembling parts of the mechanism, locating and correcting troubles in connection with an introductory study of engines, carburetors, cooling systems, ignition systems, clutches, transmissions, and the differential.

Courses were also given in recreational music, the care and conservation of children, first aid, and physical preparation for agricultural work. An elaborate scouting program was given, some notice of which appears elsewhere in this issue.

A students' committee also canvassed the students of Teachers College to learn their vacation plans concerning war service work for the summer. The result of this canvass indicated that practically every regular student of Teachers College was planning to devote from one to three months of the summer to war service of some one of the kinds mentioned above.

DR. STRAYER DIRECTS THRIFT CAMPAIGN

In his capacity of director of the National War Savings Committee, Professor Strayer has supervised the preparation of a number of bulletins designed to promote the thrift campaign in the public schools.

A bulletin, entitled *How to Win the War*, which is intended to be used as supplementary reading in upper grades of elementary schools and for the study of English in high schools, has been sent in considerable quantities for distribution to the schools.

In this bulletin the fundamental doctrine of the saving of goods and services is most concretely presented. A limited number of additional copies of this bulletin are available for schools that will use them. The reading and careful study of this bulletin will help to lay the foundation upon which the Thrift Campaign in schools may be built.

Another bulletin defining the terms of a National Poster Competition has been provided for the supervisors of art in each city school system, and has been sent to some hundreds of art schools. The interest of the older pupils in the elementary schools and in the high schools will be stimulated by the attempt which they make to portray in posters the theme which they have come to understand through their study of the War Savings idea, as presented in the bulletin described above.

With the coöperation of the Committee on Public Information there has been issued a Junior Four-Minute-Men War Savings Contest bulletin. In this bulletin there is provided subject matter for the preparation of speeches on War Savings. Certificates have been sent which, when properly endorsed by the principal of the school, designate a pupil from each school, or from each grade from the larger schools, as Junior Four-Minute-Man. A speaking contest of this sort will do much to encourage children in their study of written and oral English and is in line with the best practice in our more progressive schools.

A series of Problems in Arithmetic for the third to eighth grades, inclusive, prepared by Professor David Eugene Smith has been sent to each city and county superintendent of schools throughout the United States. These problems emphasize the Thrift Stamps and War Savings Stamps values in relation to the cost of equipment and supplies used by our Army. Other materials of this sort, supplementary to the courses of study now taught in schools, will be made available from time to time.

There is in press at this time a bulletin entitled *Learning How to Save*, which was prepared by Professor Benjamin R. Andrews. The attempt is made in this bulletin to bring home to children, and to their parents as well, the necessity for budgets or money plans, and the desirability of keeping accounts. A form is given which will enable children to make their budget or money plan, emphasizing the idea of saving, and along with it a scheme

for accounting is provided. After they have undertaken this type of accounting they are asked to help their family to make budgets or money plans, and to keep family accounts. Authoritative information concerning the proper distribution of the family income among the several items of expense is given, and the division of the total amount available for food among the more important items of diet is indicated.

There is also being sent out a bulletin containing suggestions prepared by Professor Ernest Horn, formerly principal of Speyer School, for the teaching of thrift through emphasizing certain topics in history, and outlines of methods for teaching thrift through English composition prepared by Professor James F. Hosic, of Chicago Normal College. A Thrift play suitable for production by children in the upper grades of the elementary school is to be printed and distributed to school systems willing to use the play as a school exercise. It may be used in opening exercises, or in schools which have a special thrift program for parents and friends.

PROFESSORS STRAYER AND BAGLEY APPOINTED MEMBERS OF N. E. A. JOINT COMMISSION

To meet the present very great emergency in education, Mrs. Mary C. C. Bradford, president of the National Education Association, has recently appointed a committee to represent the association in mapping out a program for the "rebuilding of civilization through a war-modified education." Dr. Thomas E. Finegan, president of the Department of Superintendence, at the recent meeting in Atlantic City, appointed a committee to coöperate with the National Education Association committee. These committees with the members of the executive committee and the board of trustees of the National Education Association, met in Washington, March 7–9, and completed the organization of a joint commission on the national emergency in education and the program for readjustment during and after the war. The joint commission is composed of the following educators representative of every phase of national education:

George D. Strayer, Teachers College, New York, N. Y., *Chairman;* Harry Pratt Judson, Chicago, Ill.; Lotus D. Coffman,

Minneapolis, Minn.; Elwood P. Cubberley, Stanford University, Cal.; David Felmley, Normal, Ill.; Mary E. Wooley, South Hadley, Mass.; W. C. Bagley, Teachers College, New York, N. Y.; William B. Owen, Chicago, Ill.; Thomas E. Finegan, Albany, N. Y.; Nina C. Vandewalker, Milwaukee, Wis.; Susan M. Dorsey, Los Angeles, Cal.; Payson Smith, Boston, Mass.; F. D. Boynton, Ithaca, N. Y.; J. A. C. Chandler, Richmond, Va.; J. M. Gwinn, New Orleans, La.; Mrs. Josephine C. Preston, Olympia, Wash.; Frank E. Spaulding, Cleveland, Ohio; J. W. Withers, St. Louis, Mo.; Mary C. C. Bradford, president, N. E. A., Denver, Colo.; Robert J. Aley, Orono, Maine; Carroll G. Pearse, Milwaukee, Wis.; A. J. Matthews, Tempe, Ariz.; George B. Cook, Little Rock, Ark.; James Y. Joyner, Raleigh, N. C.; Walter R. Siders, Pocatello, Idaho; Agnes E. Doherty, St. Paul, Minn.

This commission plans to enlist the services of all the educators of the country and to coöperate with all the agencies related to educational readjustment in outlining a progressive program of education. Adequate teacher training, a complete program of health and recreation, rural education, immigrant education, the education of adult illiterates, training for all forms of national service, the necessary wartime readjustments, and the coördination of war service in the schools, are among the problems to be considered definitely by the commission. The commission met in Washington, April 10, and made a preliminary report at the annual session of the National Education Association at Pittsburgh, June 29 to July 6.

EDUCATIONAL SOCIOLOGY AND VOCATIONAL EDUCATION

Professor Snedden, who has been active for a number of years in what was formerly known as the National Society for the Promotion of Industrial Education, was elected president at the annual meeting held in Philadelphia in February, when the organization changed its name, to suit its future policy, to the National Society for Vocational Education. This society, which has been instrumental in accomplishing much in the old field,

is now pushing forward to meet the new conditions brought about by the enactment of the Smith-Hughes law providing federal support of vocational education in every state, and aims to co-operate with leaders in the vocations for the improvement of various types of vocational education.

Professor Snedden upheld the affirmative in a debate on April 25 in Philadelphia, under the auspices of the University Extension Society, on the topic: "Resolved: That Latin should not be required, either for entrance or in college for any bachelor's degree in liberal studies." The negative was taken by Dean Andrew F. West, of the Graduate School of Princeton University.

Professor Dean was one of the most active representatives of the College in war work during the spring, organizing the courses in physical and occupational therapy.

On Friday evening, April 5, the Vocational Education Club and their guests met in Milbank Chapel to listen to an address delivered by Doctor Mabel L. Robinson, of the Carnegie Foundation, upon the topic, "Vocational Education and Vocational Guidance of Women."

FINE ARTS

The possibilities and uses of the fine arts in war time are for the most part unguessed by the casual observer. The following summary indicates the scope of the war activities of the fine arts department of Teachers College.

Posters. For Y. M. C. A. campaign, Liberty Loans, War Savings Stamps, Teachers College World Democracy Movement, Red Cross, Food Conservation, Potatoes *vs.* Wheat, Farm Units, Clothing Conservation, and general patriotic uses.

Post Cards. Set of six patriotic postcards designed and cut on linoleum blocks by students. Proofs in color made on the fine arts department press—edition of five hundred printed by William E. Rudge, 218 William Street, New York City. Christmas cards designed, cut and printed by students—proceeds given to Y. M. C. A. Fund.

Fine Arts Win-the-War Exhibit. "Lest we forget"—large photographs from Reims and Amiens cathedrals from a collection belonging to Professor Dow, including over one hundred platinum

prints of details of Reims. Post-card photographs of the cathedrals of Reims, Amiens, Paris, and Chartres. Post cards showing French villages as they now are. Etchings by French soldiers, loaned by Miss Grace V. Bliss. Silver ring set with a fragment of glass from a shattered window of Reims cathedral, bought from a wounded French soldier by Sergeant Claggett Wilson, of the Naval Reserve, who is now at the front. Bead necklace made by a wounded French soldier, loaned by Miss Grace V. Bliss. Designation targets painted under Mr. Martin's direction. Designs for lace to be made by Belgian women during reconstruction. These were done for the late Madame Van Schelle.

Occupation Therapy Work. Miss Tannahill's classes: Designs for hooked rugs, plates, dishes; painted containers, and paper-covered boxes; lettering; designs for posters and cards; wood block printing on paper and cloth.

Miss Cole's classes: Design, wood block printing, book-making.

Mr. Upjohn's classes: Pottery, models of trenches, models of the war zone. This last included a class project consisting of a large and realistic model of a district in the war area "somewhere in France," which showed shell-torn hillsides, a Gothic cathedral and adjacent buildings, gun emplacements, and camouflaged highways on which were miniature ambulances hastening to the dressing stations.

Miss Humphrey's and Miss Bliss' class: Basket-weaving.

Miss Northrup's and Miss Wilmot's classes: Clothing and costume economies and conservation.

Mr. Thatcher's class: Tin-can work, toy-making and utensils from used tin-cans.

Emergency Course. Patriotic posters cut and printed from linoleum blocks, under direction of Professor Dow, Mr. Martin, Miss Tannahill, using printing press, copying press, and clothes-wringer.

There were also exhibited large linoleum-cut war posters in full color, made by Mr. Preissig, former instructor in color printing at Teachers College, a collection of French war posters, and American war posters.

Teachers College students took part in the W. S. S. competition. Some of their posters are now on exhibition at the New York Public Library at Forty-second Street and Fifth Avenue.

A question often raised is: What fields other than teaching are open to the woman who comes to Teachers College to study art? In partial answer to this Professor Dow some time ago prepared the following list of women art students who were then earning their living by the practice of their profession.

Miss A—Assistant in an art gallery, Fifth Avenue, New York, $1,000 per year.
Miss B—Design and handicraft shop, $2,000 + per year.
Miss C—Design and handicraft shop, $2,000 + per year.
Miss D—General design, $2,000 per year.
Miss E—Designer for a fashion paper, $1,000 per year.
Miss F—Designer and illustrator, $1,800 per year.
Miss G—Art lecturer, etc., $1,000 per year.

The salaries of the following are not known exactly and can only be stated in general terms as being from $1,000 to $5,000 yearly.

Miss H—Head of the department of house decoration in one of the largest concerns on Fifth Avenue, New York.
Miss I—A house furnishing business.
Miss J—House decoration studio in New York.
Miss K—House decoration work in Boston.
Miss L—House decoration studio in the Middle West.
Miss M—Designer of posters and commercial advertising.
Miss N—Wood block color prints.

In addition to these there is a group of six or more working in ceramics with good financial return; also others in metal-work and in photography.

Within the past year or so more of Teachers College students have entered the textile design field, and with the coöperation of Mr. Crawford, of the Museum of Natural History, and silk manufacturers, it is hoped that a great deal will be done in that line.

Finally, the demands for teachers of art have been far in excess of our ability to supply.

LINCOLN SCHOOL

Charles K. Taylor, chairman of the department of physical education, is resigning his position at the Lincoln School to go into Y. M. C. A. service and plans to go overseas.

Raleigh Schorling, of the department of mathematics, also expects to be called for service.

The Lincoln School bank has now over $1200 of Thrift and War Savings Stamps bought from the students' allowances together with various amounts which they have earned.

The Lincoln School has recently taken over the dwelling-house at 56 East Fifty-seventh Street. This building will be connected to the school by a passageway and is to be used as an annex.

An automobile bus has recently been secured to convey pupils to the playground at Ninety-fifth Street and Fifth Avenue, a mile from the school.

During the spring term a Boy Scout troop has been organized with Mr. C. W. Finley as scoutmaster. John Russell, the Dean's youngest son, has taken an active part in the organization of this troop.

MATHEMATICS

Professor David Eugene Smith has recently prepared a series of problems on Thrift Stamps and War Savings Stamps. These problems have been published by the Government and circulated in all the large school systems in the country. They are intended for use in Grades III to VIII of the elementary schools.

An article by Professor Smith and Mr. Jekuthial Ginsburg, a graduate student in mathematics, on "Rabbi ben Ezra and the Hindu-Arabic Problem" appeared in the March number of the *American Mathematical Monthly*. Mr. Ginsburg has recently begun the publication of a series of articles on the history of Hebrew mathematics. These articles are appearing in *Hatoren*, a periodical published in the Hebrew language in New York City.

Professor Smith's recent reviews have been one on *The Casting-Counter and Counting Board* by Professor F. P. Barnard, in *Science* for February 8, and one on Professor Cajori's revision of his *History of Elementary Mathematics* in the *Bulletin of the American Mathematical Society* for March.

A "Union List of Mathematical Periodicals" by Professor Smith and Dr. Caroline Eustis Seely (formerly a student in the department) has recently been published by the United States Bureau of Education as Bulletin No. 9, 1918.

An interesting piece of historical work in mathematics is now being undertaken by Professor R. B. McClenon, of Grinnell College, Iowa, who has spent a semester in Professor Smith's library. This work is a translation of the *Liber Quadratorum* of Leonardo Fibonacci, written early in the thirteenth century. Professor McClenon is at present working upon the explanatory notes.

On March 9–10 Professor Clifford B. Upton gave four addresses at Greenville, N. C., before the Association of Teachers of Mathematics of North Carolina. On April 10 he gave an address before the Mathematics Section of Schoolmen's Week at the University of Pennsylvania and on May 10 he gave an illustrated lecture to the Mathematics Club of Hunter College, New York City.

At the request of the department of nursing and health of Teachers College Professor Smith, in coöperation with Professor Upton, and Miss Nina Diadamia Gage, principal of the Hunan-Yale School for Nurses, Changsha, China, has prepared a thirty-two page pamphlet on Mathematics for Nurses to be used in training schools for nurses and in army hospitals for the purpose of giving concise information regarding the calculations involved in making antiseptic solutions of various strengths and in determining or modifying the dosage of medicines. The pamphlet contains all the tables of weights and measures used in medicine and pharmacy and a brief explanation of the metric system for nurses preparing for service in France. Several special tables are included which have been prepared to enable nurses rapidly to prepare antiseptic solutions without the necessity of making calculations. The pamphlet is published by the Bureau of Publications, Teachers College.

NURSING AND HEALTH

Professor Mary A. Nutting has recently been awarded the Liberty Service Medal by the Council of the National Institute of Social Sciences and of the American Social Sciences Association. This medal is given for notable humanitarian or patriotic services for the national welfare. Miss Nutting is one of the first three to be awarded this medal and the first woman to be so honored.

Miss Mary S. Gardner, director of the Visiting Nurse Association at Providence, and a lecturer in the department of nursing and health, has had an honorary degree conferred upon her by Brown University.

In order to provide for a large and steady expansion of the Army Nurse Corps without at the same time depleting too greatly the nursing resources of the civil population, the Surgeon General has been authorized by the Secretary of War to establish an Army School of Nursing. In several of the great cantonment hospitals training schools will be opened up and organized without delay and affiliated with civil hospitals for branches of instruction not included in military establishments. This system will eventually be extended throughout the majority of the hundred or more military hospitals of the country. Assistant Professor Annie W. Goodrich, of this department, who was recently appointed chief inspecting nurse of the Army and given an indefinite leave of absence, has been appointed dean of this new school, and will direct and develop the plan. The opening up of schools in these cantonment hospitals will afford a large and unusual opportunity for direct service to the nation to the many hundreds of women who are eager to place themselves at the disposal of the country.

In the extensive educational propaganda conducted by the National Committee on Nursing, much of the material which has been sent out over the country has been prepared by Assistant Professor Isabel M. Stewart. Of the several pamphlets, *Opportunities in the Field of Nursing* is in its thirty-fifth thousand; *Nursing, a National Service*, thirtieth thousand; *A Message to Secondary School Principals and Teachers*, twentieth thousand; and a new pamphlet of twenty-two pages, entitled *Notes for Speakers on Nursing*, is in the printer's hands and will be widely used in the coming efforts to enlarge further the nursing resources of the country.

In addition to the large number of graduates of this department who are serving in military hospitals abroad, Harriet Leete is engaged in infant welfare and public health work in France; Florence Patterson has been assigned to public health work in Roumania; Edith Maderia and Emma Wood have gone with a unit to Palestine; and Mabel Fletcher is with a public health group in Italy.

At the request of the department, Professor Smith in coöperation with Professor Upton, of the mathematics department, and Miss Nina Diadamia Gage, principal of the Hunan-Yale School for Nurses, Changsha, China, has prepared a thirty-two page pamphlet on Mathematics for Nurses to be used in training schools for nurses and in army hospitals for the purpose of giving concise information regarding the calculations involved in making antiseptic solutions of various strengths and in determining or modifying the dosage of medicines. The pamphlet contains all the tables of weights and measures used in medicine and pharmacy and a brief explanation of the metric system for nurses preparing for service in France. Several special tables are included which have been prepared to enable nurses rapidly to prepare antiseptic solutions without the necessity of making calculations. The pamphlet is published by the Bureau of Publications, Teachers College.

PHYSICAL EDUCATION

Miss Colby and Miss Frost, from the physical education department, attended the National Physical Education Society's annual meeting in Philadelphia, April 10–13.

Miss Drew is directing the training in physical therapy of the reconstruction aides for war service in military hospitals. Other members of the physical education staff as well as several outside lecturers are taking part in the instruction.

Dr. Van Kleeck has been called to Government service as an officer in the Medical Reserve.

Captain Hawkins, of the British Army, who is in this country on an educational mission from England and France, spoke to the members of the physical education department on Thursday, April 11, on Physical Education in the Schools of France. His talk was based on an experience of many years with an experimental school for boys at Chantilly, near Paris.

Under the direction of the Settlement Committee of R. O. R., a group of the students are conducting a recreation program for soldiers and sailors on Tuesday evenings in the Thompson Gymnasium. Two purposes are kept in view: First, to provide rational amusement for a number of enlisted men; and second, to train

the young women of the department in the selection and adaptation of material suited to such groups.

Dr. Thomas D. Wood recently spoke before the Women's City Club of Boston on the topic, "Health Problems of Middle Age." He also attended the special conference on A National Program of Physical Education, called by United States Commissioner Claxton at Atlantic City, and was present at the meeting of the National Committee on Physical Education, United States Bureau of Education in Washington, held April 8. Dr. Wood has been appointed chairman of the subcommittee on data of the National Committee on Physical Education.

SCIENCE IN THE SPEYER AND HORACE MANN SCHOOLS

At the Speyer School during the past year science has been presented wholly in projects. The aim has been to obtain at the end of the year a large number of projects which would interpret for pupils those matters of scientific interest which they meet in the home, in the school, on the street, in the newspaper, and elsewhere. These projects, arranged and classified on the basis of importance in our environment, frequency of occurrence, and particular individual needs, will form the nucleus of what may perhaps be termed a Course of Study in General Science. This course will indicate some of the 'minimum essentials' in science; i. e., those environmental elements which every intelligent citizen ought fully to understand and appreciate. Beyond that 'the course' will be valuable for any other group of pupils to the extent that the latter approaches the Speyer School group in interests and environment.

The method employed by Morris Meister, teacher of science in the Speyer School, is that of the 'individual project' as distinguished from the 'group project.' During the term each pupil works on a problem of his own choice. In this work he is guided, first, by a schematic outline elicited from the class, and second, by conferences with the teacher. Wherever possible he prepares and performs experiments, obtains lantern slides, charts, pictures, specimens, and diagrams; his source of material being a bibliography of books, newspapers, and magazines compiled by himself. On a date set, he presents the results of his labors to the class, having previously posted a list of questions covering

his project, which list every member has transcribed into his notebook. In the recitation following the lecture the pupils present the answers to these questions. With very few exceptions all of the recitation periods are devoted to these presentations.

Certain valuable results have already been obtained with this form of socialized recitation. The interest seldom lags, the participation is nearly universal, and the teacher merely directs from the background. The task for any period is clearly defined. The class is seeking the answer to some very vital and interesting question; the pupil in charge, full of information, is there to supply that demand to the best of his ability.

Another most important feature of the science teaching at the Speyer School is the organization of three science clubs which, among many other things, use the school building as a laboratory. Already the boys have repaired the alarm bell system of the building, installed a complete telephone outfit of their own construction, wired up a new bell system to announce the end of each period, repaired a projection lantern, and are operating the machine during the school assemblies.

In Grades IV, V, and VI of the Horace Mann School, general science is being taught through class projects. The subject matter accordingly represents the vote of the class rather than the choice of each individual student. Under the direction of George D. von Hofe, one of the teachers in science, each project is divided into its various phases, and thus smaller projects are created for individual study and report. The pupil then chooses that phase in which he is most interested for his own research. The following are some of the matters that have been considered and represent the type of work that has been going on the past year—the sun, moon, and stars; the air, ventilation; the New York City water supply; aeroplanes, gas engines, submarines, and automobiles.

SCOUTING

A notable sign of these progressive times was the large enrollment in the new course in girl scouting held during the emergency week, May 20–27. Women of physical and mental vigor, alert, resourceful in civic as in home life, are going to be needed to meet

the new conditions forced upon us by the war. Scouting is a way to help little girls grow into such women, and it cannot be started too soon. One hundred and sixty students of Teachers College vigorously undertook the scouting course, passed their tenderfoot test on the third day, and went valiantly on to the second class test before the nine days were over.

Lined up with military precision by patrols in the big gymnasium every morning at nine very sharp, by their commander-in-chief, Dr. Fretwell, they were duly inspected by the four captains: Diller, Frost, Lutz, and Watson; gave the girl scout promise of duty to God and country and community; recited the scout laws and pledged allegiance to the Stars and Stripes. Then retiring to their respective drill rooms, each troop with its captain worked intensively, marching and counter-marching, tying knots and practising the international code of signaling. Reassembling at ten o'clock each day they had various memorable demonstrations. They sniffed, listened, and took notes while delicious camp dishes were prepared, they watched with interest while a real and squealing baby was bathed and dressed; they learned to make an invalid's bed and an ordinary bed in proper fashion; they sewed a seam, did some hemming and made a neat buttonhole. They learned the eight points of the compass; what to do for frost bite and poison ivy; they made a drawing of the United States flag; they began to learn to swim in the pool; they played scout games. Scout leaders of national distinction talked to them and answered questions, and the scout war program was discussed. There was an interesting demonstration of the campers' kit-cart.

The afternoons were properly devoted to outdoor scouting activities. Seven days out of the nine found the scout leaders in the open and the woods, where hiking, signaling, wood-craft, or nature-study, with outdoor cooking in the tidy assemblage of tinware each carried in her haversack, followed by games and stories about the campfire closed each stirring but joyful day. Through the generosity of Mrs. Low, national president of the Girl Scouts, one hundred and fifty of these leaders enjoyed a rally of girl scouts one pleasant afternoon, on the grounds of Mrs. Arthur Choate at Pleasantville, New York; and on the last day, after their tests were passed, they all finished with some impromptu and merry junketing in the big gymnasium.

As these Teachers College students scatter to their homes all through the United States, they will start troops of young girls and inspire them with the splendid civic spirit of the scouts whose motto "Be Prepared" is of striking significance at the present moment.

THE BRITISH EMPIRE CLUB

The British Empire Club during the past year listened to a series of addresses by a number of interesting speakers. His Excellency Sir Walter Davidson, K. C. M. G., late governor of Newfoundland and governor-elect of New South Wales, described simply and vividly the raising of the Newfoundland Regiment and of his meeting it again at Sir Douglas Haig's headquarters in France, immediately after it had been in action; Major James Smyth, dean of the Wesleyan Theological College, Montreal, gave a lecture on the war, illustrated by slides taken by express authority of the British Foreign Office; and Mr. P. Whitwell Wilson, parliamentary correspondent of the London *Daily News* gave a brilliant analysis of the present political situation in Great Britain.

On March 7, the club had the pleasure of hearing a *causerie de guerre* by Mrs. Hamilton Osgood, who revealed the hopes and ideals of the men and women in war service by reading a series of personal letters from "over there." On April 17, Dr. J. C. R. Ewing, president of the University of Lahore, spoke of British Rule in India. One of the special features of the year was the exhibit of Mrs. Fiske Warren's collection of war posters.

Mention should also be made of the honor which has been conferred upon the vice-president of the club, Dr. Vincent P. Burke, who has been appointed a member of the Most Excellent Order of the British Empire by King George, in recognition of his services, both in recruiting and on the patriotic associations of Newfoundland. This appointment is unusual since the Order of the British Empire is almost the only honor conferred by the King upon civilians.

THE WOMEN'S CLUB OF TEACHERS COLLEGE

During the past year the Women's Club of Teachers College became an established organization with an enrollment of

one hundred and nineteen active members. The club extends a cordial invitation for membership to all women students in the School of Education and those in the School of Practical Arts who have had two years of professional training and two years of experience.

The club offers hospitality to members and friends by providing a meeting place, a cup of tea, and a chance to become acquainted with interesting people from everywhere.

The club rooms at 503 West 121st Street are open officially every afternoon and evening, from two until ten o'clock, except Saturdays and Sundays. Members may arrange to use the rooms at other times and may obtain keys from the executive secretary. An opportunity is here given for members to entertain small groups of friends at luncheon, afternoon tea, or supper, if they care to prepare refreshments in the club kitchen upon the payment of a nominal sum for the use of dishes, kitchen utensils, and gas. The use of a typewriter or sewing machine may also be secured at the rate of five cents an hour.

All of the club's interests are not play interests, however. The members have made knitted garments for the Red Cross and other articles for the Red Cross and for the French War Relief Fund. In March, the club became the official agent for the sale of Thrift Stamps and War Savings Stamps in the College.

ALUMNI ACTIVITIES

TEACHERS COLLEGE IN WAR SERVICE

Letters from "over there" are always read with interest by the folks at home. For that reason the RECORD is here printing three letters from persons well known to many of the alumni of Teachers College. The first letter was written by Claggett Wilson, a former instructor in the department of fine arts, who is now in the United States Naval Reserve, and is addressed to Professor Dow.

Somewhere in France
March 15, 1918

My dear Mr. Dow:

The fine box arrived three days ago but this is the first moment I have had to myself and to attend to the little niceties of life such as acknowledging these kind remembrances which bring their message, welcome and appreciated, to this strange unearthly world over here.

Every piece in that box was a treasure and was duly considered before it was eaten—for sweets are one of the links that still hold us to the life that used to be—and will be again—which knew no sickly-sweet poison-gas, shrapnel, mud-dugouts, raids, machine-guns, peering aeroplanes, strained night-watches and flare-bombs and the thousand things and happenings which make up the muddy, dusty mosaic of 1917–1918.

And when it gets too much for me I begin to paint and draw—in my imagination—and it usually saves the day. I cannot complain of anything for this life has, I think, given me a new and certainly stronger vision than ever I thought I should have—a vision, clear and direct, which I am eager and full of, to put on canvas or otherwise reflect as I may feel. That may be a long time from now but it will only be the stronger and the fresher for the waiting—and what the Great War is doing for me it has done, is doing, and will do for many others; one need not be under fire nor live the strange life of the front to feel its scourging purification for it extends everywhere and is for us all.

I have had the good luck just to have heard from Mr. Cox—a fine bright letter, full of hope and spirit; he seems to be fit and busy and says Mrs. Cox is the same. I am going to try to answer in as gay a vein.

Also, I have a letter from Miss B—— —came three days ago—and she tells in interesting fashion of the dozen and one absorbing activities about the fine arts department. I think of all the things associated with each season as it comes around and Thanksgiving, Christmas and Easter find me picturing to myself just what you are doing—and I feel sure the department is keeping up its reputation.

It may seem stupid to say I have no news but such is the case—excepting the little that we see ourselves, only rumors reach us from the other parts of the line and the newspapers alone are reliable; they bring the real news to us, to New York, to Paris, to Tokio alike. So the *life* is alone interesting and that can only be told—when we get back.

Kindly express to the fine arts staff my thanks for the fine box of goodies and tell them it was so many pounds of sugared sunshine dropped into what was for the moment a little gray mud-hole! . . .

Very sincerely yours,

CLAGGETT WILSON

The second letter is from Dr. W. T. Woody, formerly assistant in the department of history of education and now in Russia as a representative of the International Y. M. C. A. This letter was written shortly before Dr. Woody's safe arrival in Russia, notice of which came to New York by cable and preceded the letter itself by several weeks. Unfortunately the censor has found it necessary to delete several of the more interesting portions of Dr. Woody's communication.

Somewhere in the Arctic Ocean
April 18, 1918

Dear ———:

My fragile little cork is bobbing around rather lively here on the cold waves, but perhaps it is not so bad but that I may not hit a few of the keys rightly. At any rate I will manage a few lines and see how you can stand it. Certainly I should say in the first place that there is no occasion for my saying anything that is of importance or that I should really like to converse with you, for I judge that all such topics of interest are also of interest to the censor and he would take them out for his exclusive benefit. That at any rate has been my usual experience, judging from what reports I get saying that my letters come to America in a rather mutilated form. I have no desire to have this one cut to pieces or thrown out, so I shall be entirely commonplace and say nothing in which you will be interested and to which the censor can make any objection.

Arriving in England, after a fair voyage over the Atlantic, it was found that it would be impossible for us all to proceed further at once. In fact, for a time, no one could move. To what government could we turn if we were able to even get on into Russia? Soon, however, one or two of the older men managed to get on after a fashion stopping a long time in Norway and Sweden, thence finally across Finland and down to Petrograd. In the meantime most of us were preparing in any way possible to be better able to live à la Russe when it would be possible to go on. Others took up temporary service in England, but it happens that a good many of those same ones are now doing permanent service there. So much for turning aside for a minute from what you once start out to do.

Finally, however, with little more assurance of success we begin our journey onward. We sailed from [*Deleted by censor*] in early April and proceeded northward hoping to enter by some northern port and still hope to do so. However, we are not certain of that for already I know of [*Deleted by censor*]. We hope to make a trial in day or so.

Weather of all sorts has favored us with its presence. Snow, rain, wind; now one, now the other, and then a mixture of all three. Moreover, our boat seems to be badly laden as she lists badly to the starboard. She is one of Germany's boats which was some time ago captured. Was then known as the [*Deleted*] and is now christened the *Huntsend*. I suppose that it must have some relation or connection to the [*Deleted*] and the end of the chase. But I do not know. Intermission—that dinner horn.

Yes, they feed us pretty well here. In fact, much better than we were used to in London. The sad thing about it is that soon we shall leave the boat and then, ah then, I know not what we shall eat.

We have an interesting cargo on board. Besides twelve of us Americans, and a few Englishmen, the rest are all Russians. Most of them are [*Deleted*]. It is interesting to hear some of them talk and they do that stunt most of the time. Especially is it interesting if you are able to talk with them yourself, i.e., have enough of their language. I find that I can use mine little, but it sure is some language. In all their conversation to you or to themselves, as they gather in little circles on the decks [*Deleted*]. How much they really understand of it I do not pretend to know.

Well, if I could write a long time there would still be much to say, and other letters are not written. So I will close and try to get this much on its way. My address is still 47 Russell Square, London, England, whence all letters are forwarded. If you are able, please forward my T. C. RECORD to me. I have never received any except the first copy which I took when I was there. Give my best regards to any friends you may chance to find enquiring. . . .

W. TOM WOODY

A third letter is also included which has been received from Frank H. Hagemeyer, a graduate of Columbia, 1916, and for some time a member of the staff of the Secretary's office of Teachers College. Mr. Hagemeyer is at present training as an aviator at Dallas, Texas, and his letter graphically describes some of his experiences in the flying corps.

Love Field, Dallas, Texas
May 29, 1918

Dear Professor ———:

It surely is high time that I had written to you; I can only plead long hours and very little time to rest, and will try now to give you a good idea of what has been happening since I came down here to the flying field.

We have had a good deal of wet weather and windy weather, and I was sick at the hospital with the grippe for three days, so am not quite as far advanced as I had hoped to be by this time. Of late the weather has cleared up and I have been getting at least an hour of flying each day.

I was assigned to a civilian instructor the first day and no time was wasted before I was out on the field in flying togs for my first flight, which was more or less of a "joy" ride. Right from the start I was taught to control the ship, and after five or six hours of work in "dual control" I was allowed to take the ship up alone for my first "solo" effort. That was the first big thrill; to know that it was up to me to take that ship around the field and land it without breaking anything, knowing that there was no instructor up in the front seat to correct any mistakes that I might make. It is easy enough to fly the ship, it is the landing that is the hard part. A perfect landing is one in which the two wheels of the landing gear and the tail skid gently come down on the ground at the same instant. The tendency is either to bring it down on the ground too soon and strike with the wheels first and then go along in successive leaps and bounds, or to be "ground-shy" and level off too soon (too high above the ground) and then to come down on all three points at once and "pancake," as they call it, or bounce up and down until the ship comes to rest. I had the first trouble, but never came down very hard on the wheels, and made pretty fair landings from the start. To date I've had four and a half hours of solo work and now can make good landings almost every time.

Today I had a very thrilling session of two hours in the air with a stunt instructor. Every cadet, after he has done a certain amount of solo work, is required to go up for these stunts, so that if, in the course of his flying, he gets into trouble, he will know how to get out of it in a hurry. Later on in the course we are required to do all these stunts ourselves. I found out just what it felt like to skid and side-slip and tail-spin, and had to pull out

of them myself. We were up at an altitude of 3,000 feet, above the lower layer of cloud, and would have gone higher but for some very heavy higher clouds which it would have been dangerous to attempt to pierce. I also was shown what a loop was like, and finally we came down in a "falling leaf" where the plane flutters first to one side and then to the other, as the name indicates, exactly like a leaf falling in the breeze. It surely was a most enjoyable morning. . . .

Sincerely yours,

FRANK H. HAGEMEYER

ALUMNI IN CHINA

Bulletin No. 15 of the Canton Christian College, Canton, China, contains much information concerning a number of Teachers College alumni which will be of interest to readers of the RECORD. The following is quoted from the bulletin, with some slight additions:

In October, 1917, a Teachers College alumni club was formed. The chairman is, quite appropriately, Mr. K. M. Wong, who has been for some years the representative occupying the chair supported by Teachers College, the Teachers College professorship of education in China. The secretary is Mr. H. B. Graybill, who was the first T. C. man to come to this work. Mr. Wong received his B.S. from Teachers College in 1913 and his A.M. in 1914; Mr. Graybill received his A.M. in 1907.

Mr. Y. C. Kwan, B.S., of Columbia and Teachers College, is in charge of the translation department of the College work and at the same time editor of the College magazine which is published in Chinese and is devoted especially to educational matters.

Mr. I. C. Lam, B.S. Teachers College, 1915, has been appointed by Canton College as principal of a large school for Chinese boys in Singapore. This school, supported by the Chinese there and managed by the College, is an attempt to solve some of the unique problems of Chinese education among emigrants who on a foreign soil find it next to impossible to master their own language and come into their native cultural inheritance. The College is planning a special fitting school for children of emigrant Chinese on its own grounds also. Mr. Lam took with him a staff of nine men from Canton on his second trip to Singapore this winter, of whom three were graduates of C. C. C. Middle School.

Miss Fung Hin Liu, M.A., who was at Teachers College during 1914–1915, has made headway in the girls' work, but finds China still a long way from enthusiasm about educating women or using them in educational work.

Her sister, Miss Fung Yan Liu, M.A., 1917, now Mrs. Folk, returned last fall, was married here at the College, and is now keeping house and teaching domestic chemistry and other subjects in mission and government schools in Canton City.

Mr. Arthur R. Knipp, a graduate of Johns Hopkins and of Massachusetts Institute of Technology, and a student at Teachers College during the Summer Session of 1916, is struggling with the problems of physics teaching and with those of athletics for Chinese students.

Mr. Graybill, who shares with Mr. Wong the courses in education in the College, is working with the committee of Middle School principals upon some of the problems of mission schools in Canton. He is working also on special methods and texts for the teaching of English to Chinese students.

Mr. Wong is planning a revision of his Chinese arithmetic books, aiming to adapt them still further to meet the difficulties peculiar to work in Chinese schools.

A NEW MEANS OF TESTING MATHEMATICAL ABILITY OF HIGH SCHOOL PUPILS

The Bureau of Publications of Teachers College has just issued an interesting and valuable monograph entitled Experimental Tests of Mathematical Ability and Their Prognostic Value.[1]

This monograph presents an analysis of mathematical ability and a means for its prognosis. On the former depends the control of the learning process; on the latter the classification of pupils and their educational guidance. Few who are familiar with actual conditions will question the need for such prognosis. How many misguided pupils are engaged in a vain quest after mathematical efficiency! How many teachers are expending effort to no purpose in assisting the slow-witted to reach required standards! How many gifted pupils are thereby deprived of the individual aid and encouragement which they would so richly repay!

Obviously this deplorable waste could be prevented, if we had a reliable means of estimating mathematical capacity, which could be applied early in the student's high school career. If we had for mathematical intelligence a measuring rod comparable to the Binet-Simon scale for gauging general intelligence, the efficiency of high schools would be greatly increased. Such a

[1]Contribution to Education, No. 89, Bureau of Publications, Teachers College.

measuring rod, however, unlike the former would be most serviceable at a particular stage in the individual's experience. It would in all probability be most usefully applied after the pupil had had some training in algebra and geometry. On general grounds it seems best that every high school student should have some acquaintance with a field of thought that has contributed so much to the advance of civilization as mathematics. Not only from a cultural, but also from a practical standpoint some familiarity with its subject-matter together with a knowledge of the part it has played in the history of the world ought not to be withheld from any child of normal intelligence. At least two years would seem necessary for this purpose. There would then be available as a basis for judgment of the pupil's fitness for further mathematical work his school record in the algebra and geometry classes and his teacher's estimate of his promise as a student of these subjects. These need not necessarily agree. For instance, a pupil might by dint of unusual industry achieve comparative success in the mastery of the mechanical operations that bulk so largely in first year algebra and might so attain a relatively high standing as measured by class examinations, and yet be regarded by his teacher as poorly equipped with the qualities that are requisite for more advanced study and as lacking those abilities that are the very essence of mathematical intelligence.

Consequently there is a real need for an independent estimate of the pupil's capacity, especially along lines which school examinations fail to measure, but which are undoubtedly essential for future success. Educational practice demands a more objective, a more reliable and a more comprehensive measure of mathematical ability, which can serve as a check on school marks and teachers' estimates. In the construction of such an instrument the principles upon which we rely in measuring general intelligence should guide us. As one would naturally expect in the case of abilities which superficially seem so disparate as those involved in algebra and geometry, and as our experimental data later established, the only safe way to gauge mathematical skill and insight is to test as many of the abilities involved in high school mathematics as possible, especially the most important of these abilities, pooling the results.

But what are the abilities involved in mathematics that are crucial in its mastery? Apparently as a preliminary to judging an individual's capacity for specialization along mathematical lines some understanding of the precise character of the demands made by the prospective tasks must be obtained. Earlier investigators had in many cases hazarded a variety of *a priori* opinions as to the nature of mathematical intelligence and generally had indicated one mental function par excellence as constituting its essence, thus suggesting the possibility that a single test devised to gauge this determining trait might serve as an index to mathematical efficiency. Such assumptions, however, are exceedingly doubtful and demand experimental investigation. An analysis of mathematical ability was, therefore, undertaken by Dr. Rogers and the results obtained are presented in detail in her monograph. A brief summary of this monograph follows.

Thirteen tests of mathematical abilities were constructed or selected, each of which, it will be granted, measures something of importance in the equipment of a student of mathematics. Six were tests of algebraic abilities and akin to these were a reasoning test and a test of skill in arithmetical problems. Five were tests of geometrical abilities, three measuring intuitive grasp of spatial relations, a fourth the ability to draw inferences when dealing with spatial material, and a fifth the capacity to make generalizations from spatial facts. Four tests of the power to deal with words were also given in order to discover how far inferiority in mathematics is due to lack of command of the vernacular.

By rigid control of the conditions of their application and scoring, objective measures of these prima facie important phases of mathematical ability were obtained. The relative status of each of these functions in mathematical intelligence and their dynamic and quantitative interrelations were thereby determined and the diagnostic value of each of the tests was ascertained.

It was found that mathematical ability is not a single function, but complex in character, involving a number of mental processes which are loosely related to each other, but all equally indispensable for successful accomplishment. While some had more importance than others, all had some part to play in determining the presence of mathematical capacity. Of the thirteen purely

mathematical tests, the six most symptomatic of general mathematical intelligence were in order of their importance the following: Algebraic Computation, Interpolation, Missing Steps in Series, Geometry, Superposition, Matching Problems and Equations.[1] It was clear from the results that no single test could afford a satisfactory measure of mathematical proficiency. It was possible, however, to discern three dominating types of ability, each essential to success with the subject. These were algebraic abilities, geometrical abilities, and verbal or language abilities. These proved of equal influence in determining the presence or absence of mathematical efficiency. Thus our results showed that so little in common do high school algebra and geometry have that language tests such as the familiar Trabue Language Scales have as great diagnostic value for algebraic ability as geometry tests possess. It is a noteworthy fact that verbal ability tests enable us to predict efficiency in algebra with as great a chance of success as geometry tests would and similarly that they are as reliable indices of the characteristics which make a successful student of geometry as algebra tests are.

If there is any one factor common to these diverse types of ability involved in mathematical functioning, it appears to be the ability to respond to partial elements in a complex total situation, in other words, to analyze and think selectively. Therefore, this, if anything, is the crucial quality determining success. Tests possessing it in high degree would best serve to indicate the presence or absence of mathematical capacity. Besides this common factor, however, which is found in different amounts in all the tests, there are specific factors of varying value which are also necessary for efficiency.

These facts have an important bearing on the choice of a group of tests which can serve as a 'foot-rule' for mathematical intelligence in the case of pupils who have had two years' training in algebra and geometry. In order to secure the best possible measure, it is essential to select a team of tests representing as many phases of mathematical capacity as possible, having maximum diagnostic power and at the same time easy of administration and economical of time. Accordingly from the original

[1] These tests may be had in sheet form in quantities for use in the schoolroom. They are sold by the Bureau of Publications, Teachers College.

thirteen tests two tests from each of the three chief groups were selected—Algebraic Computation and Interpolation; Geometry and Superposition; Mixed Relations and Trabue Language Scales L and J. These six tests,[2] known as the Rogers Sextet, gauge respectively the ability to grasp and manipulate numerical and algebraic symbols; the ability to analyze numerical symbols, to perceive a general rule implicit in them and to apply the principle so derived; the ability to draw inferences with spatial material; the ability to grasp intuitively spatial relations; and the ability to apprehend and manipulate words.

If this sextet of tests is applied and scored under the conditions described in this monograph, it provides a reasonably accurate measure of the mathematical ability of the pupil. By its aid we can prophesy with a known degree of certainty from success with the tests a successful record in future work and we can predict failure in the future from failure with them. The scores obtained must be expressed as so much above or below the class averages obtained by the Horace Mann group examined and then summed in the manner described in the text. Should a student have a total composite score of 150 or more above the Horace Mann average, he is of superior ability and should be given opportunity to progress at a more rapid rate than the ordinary student. Should he, on the contrary, have a score of more than 150 below the Horace Mann average, he is markedly inferior in capacity and, other things being equal, should be advised to discontinue the subject.

The independent estimate of mathematical intelligence so obtained will be invaluable to those responsible for the promotion and guidance of pupils. A basis for improvement in classification is provided and a difficult administrative task is facilitated.

It should be emphasized that the tests owe their value not only to the fact that they are relatively exact measures and objective measures, but that they measure abilities untested by ordinary examinations and important for success in the future study of the subject. Further they ascertain the ability of the individual in greater detail, locating weakness or talent. Thus from them it is possible to discover whether the pupil's progress in solid

[2]These six tests may be obtained in quantities from the Bureau of Publications, Teachers College, for use in testing high school pupils.

geometry is being hindered by feeble intuitive grasp of spatial relations or whether a poor command of English is the cause of failure in algebraic problems. By means of a graph for locating special disabilities, devised by Dr. Rogers, we can see at a glance in which types of ability the individual in question excels or falls short. While the six tests are far from doing so with perfect precision, nevertheless, they furnish evidence that suggests a more extended inquiry and will prove useful, since in an hour and a half of time they provide a reasonably accurate measure of the student's mathematical capacity.